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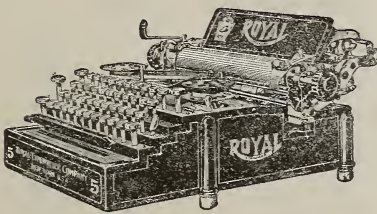
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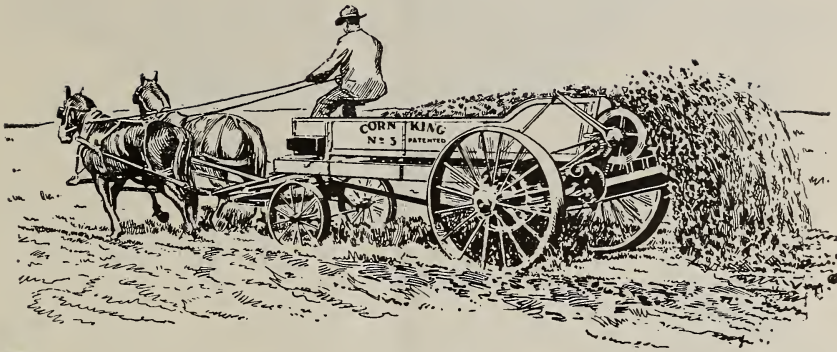
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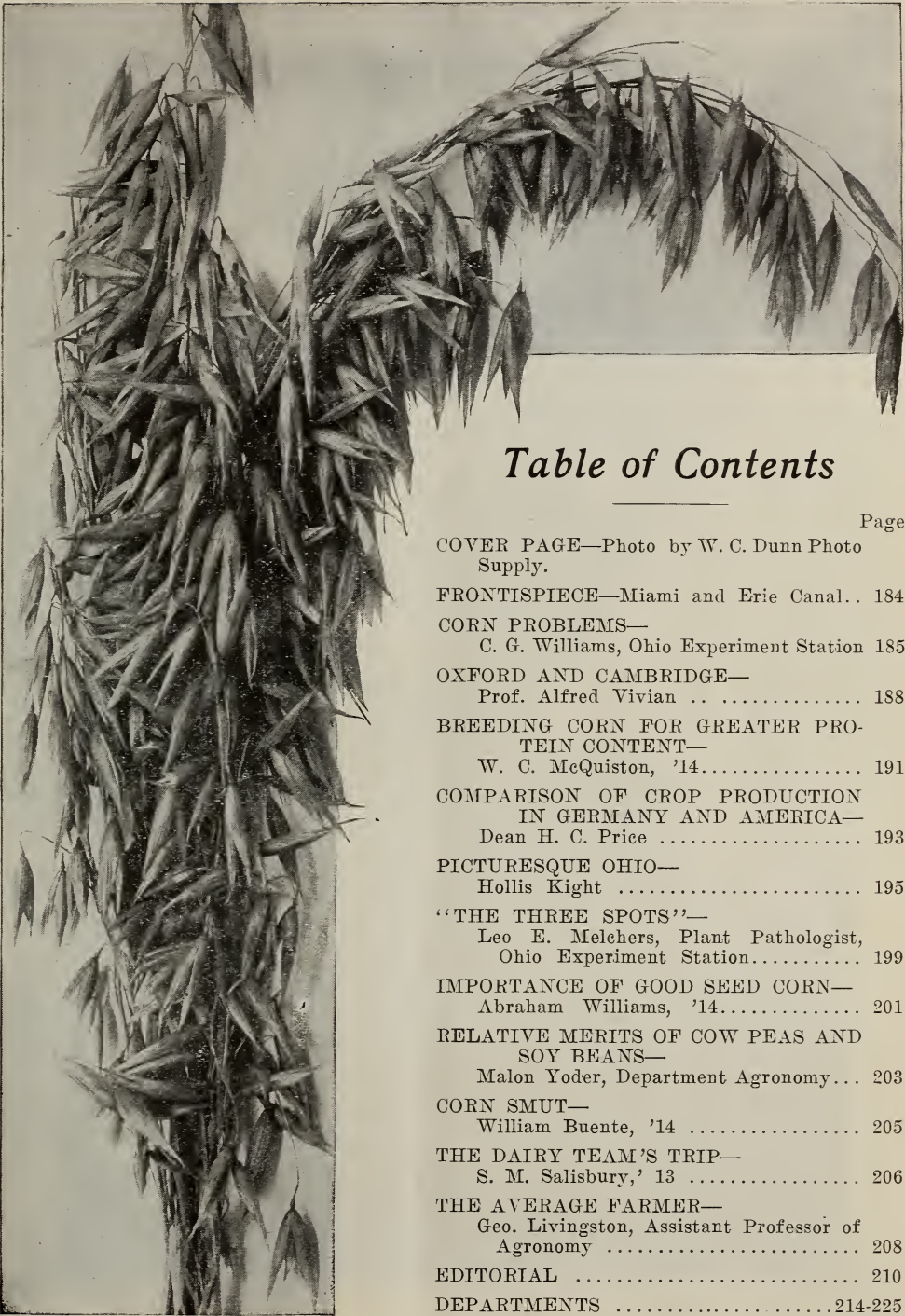


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THE AGRICULTURAL STUDENT

Vol. XIX. OHIO STATE UNIVERSITY, COLUMBUS, NOVEMBER, 1912 *Number 3*

Corn Problems

C. G. WILLIAMS

Chief of the Department of Agronomy, Ohio Agricultural Experiment Station

THE problems of the corn farmer may be sifted down to one all inclusive problem, to-wit: How to grow the maximum crop of marketable corn?

There are many ways of approach to this problem. Perhaps the first and most important is the drainage road.

Drainage: There would seem to be small need for saying anything about better drainage in this day, yet the fact remains that acres and acres of land in this state are being cultivated in corn and other crops, year after year, under conditions which are bound to fail during seasons in which we have an abundant rainfall during the few weeks succeeding corn planting. There is probably no one investment which many farmers could make, which would bring the returns in the way of increased crops that an investment in tile drainage would bring. And the farms are indeed few upon which more tiles could not be used with profit.

Rotation: The subject of rotations is one which will admit of some further study upon many farms. Its bearing upon the economical production of farm crops is not fully appreciated. As throwing light upon this subject, attention is called to some rotation experiments of the Ohio Station. Very similar soil areas have been devoted to the continuous cropping of corn and to the growing of corn in different rotation systems. Under both plans, plots have been cropped without the use of ma-

nure or other fertilizers, as well as with stable manure and with different fertilizer mixtures. It is of interest to note that in the course of 15 consecutive crops of corn on the same land the yield has declined 19.7 per cent, in spite of the fact that during these 15 years 75 tons of manure per acre have been applied. On very similar land, with the use of only 48 tons of manure per acre, corn grown in a five-year rotation has increased in yield during the same period 46.9 per cent. There were five separate sections included in this rotation experiment so that a crop of corn was grown each year, thus doing away with any variation due to seasonal differences.

The economic value of a well-planned system of crop rotation is apparent.

Organic matter: Our soils everywhere are becoming deficient in organic matter. By what means can this deficiency be overcome? The manure product of the farm is deserving of first consideration. Many farmers are handling this product in a way which is very wasteful of its organic matter. Determinations made by the Ohio Station of the amount of organic matter in fresh manure in January, as compared with the amount found in the same manure three months later, show a loss of 38.75 per cent. There is much loss of organic matter in the feeding of the products of the farm and the making of manure, even under the most favorable condi-

tions, therefore the greater reason of conserving that which escapes the digestive tract.

Beside, the manure losses incident to fermentation and leaching are not confined to the organic matter. Experiments show that the losses of phosphorous, potassium and nitrogen run from one-fourth to one-third of its total value.

Important as is the manure product of the farm, one would make a sorry plight of maintaining the organic matter of his soil without clover and grass. Goods sods are of vast importance. With watchful and intelligent use of the various legumes and grasses as catch crops, as opportunity affords; and in particular, of the very useful and not yet fully- appreciated plant, rye, it would seem that this problem might be taken care of.

Lime: The necessity for an abundant supply of carbonate of lime in the soil is now quite well understood in those localities where soils have long been deficient in this compound. Many sections which are only just beginning to experience a shortage are not yet aware of their needs. Upon the former type of soil, such as is found on the Experiment Farm at Wooster, the yields of clover hay have been increased all the way from 33 to over 150 per cent by the use of a ton of ground limestone every 3 or 4 years.

Where lime is needed, the failure to apply it can but result in serious loss.

Phosphorus: With the organic matter and the lime content of the soil well cared for, the only other element that will, as a rule, call for attention is that of phosphorus. Good applications of fresh stable manure will not meet this need for phosphorus.

In a test now extending over 15 years, in which fresh stall manure, applied at

the rate of 8 tons per acre every 3 years, has been compared with similar manure to which 320 pounds of either acid phosphate or raw rock phosphate have been added, the yields of corn have averaged 59.46 bushels per acre from the untreated manure and 65.00 bushels from the manure reinforced with phosphorus.

The yield of the other crops of the rotation have been increased in like manner for the one application of phosphorus, giving on the average increases of the 3 crops worth \$10.76, for an expenditure of \$1.90 for phosphorus—a return which will cover all other expenses incident to the use of the phosphorus and still leave a most handsome profit.

Good varieties: After consideration of soil, come those of the plant; and first among these is that of variety. A variety of corn should be adapted in point of soil and season to the conditions under which it is to be grown. Reports from different parts of the state indicate that this year, as heretofore, many varieties have been grown that are poorly adapted to Ohio conditions with respect to the length of seasons required for their complete maturity.

Among varieties which are quite well adapted to given conditions, there is likely to be found quite a variation in yield. It would therefore appear that there yet remains a great opportunity to improve our yields of marketable corn by the selection of better varieties.

Good seed: There are two factors involved in the securing of good seed, viz., early and wise selection, and the proper care of the seed after it has been selected.

The selection of seed corn from the standing plant is to be preferred, in that it enables one to secure ears that

have been grown under normal conditions of stand and fertility and ears born on vigorous, upright plants. In a word, plant selecting tends to give one seed of better heredity than wagon or crib selection.

But whether the selection of seed corn be from the plant or wagon, let it be made early enough that it may be put in good seed condition before freezing weather arrives. Seasons when corn carries an extra amount of moisture, or when cool damp weather prevails during October and November, artificial heat is desirable. It must, however, be utilized under conditions of good ventilation.

Good seedbeds: A well-prepared seedbed is a factor of no little importance. The first step in this preparation is good plowing—and how rare really good plowing is! It results from a happy union of a good workman, a good plow, good power, soil in good condition as regards moisture and free from obstruction, both seen and unseen.

The probabilities of securing an ideal seedbed will be greatly enhanced if the plowing is done early, preferably during the late fall or early winter, or at least very early in the spring. Then, as the plowed land dries out in the spring, the use of the disk and other harrows, the drag and often the roller, depending upon the dryness of the soil, will bring about the desired object.

Timely planting: Unless the seed corn be planted there will be no crop. Unless it be planted in good time the chances of its maturing in good condition will be greatly reduced. Not only the quality, but the quantity also

hinges largely upon the time of planting.

Note the following figures of experiments conducted at Wooster:

Early and Late Planting of Corn.

Latitude 40° 41'

Altitude 1,030 feet

Five years' results.

Date of planting.	Average	
	Yield per acre bushels	Percent of moisture
April 27-30	70.0	23.2
May 6-10	73.3	23.9
May 14-20	71.5	24.9
May 25-30	60.5	28.1
June 2-5	45.6	33.3

Surely Ohio is losing many thousand bushels of corn annually as a result of late planting.

Early and thorough cultivation:

One or two cultivations should be given corn after planting, before it comes up. A smoothing harrow or weeder should be used for this purpose. If the ground has been packed by heavy rains—the harrow is the proper implement, and it may be necessary to weight it. If the ground is loose and dry, the roller should be used and immediately followed up with the weeder.

The riding cultivator should be started as early, and kept going as long as possible. Then, ordinarily it will pay to use the one-horse cultivator a time or two. In dry seasons particularly this use will yield great returns.

The maximum crop of corn! Who knows what this is? And yet, with the corn grower doing his part, as briefly outlined above, he will approach nearer and nearer to it.

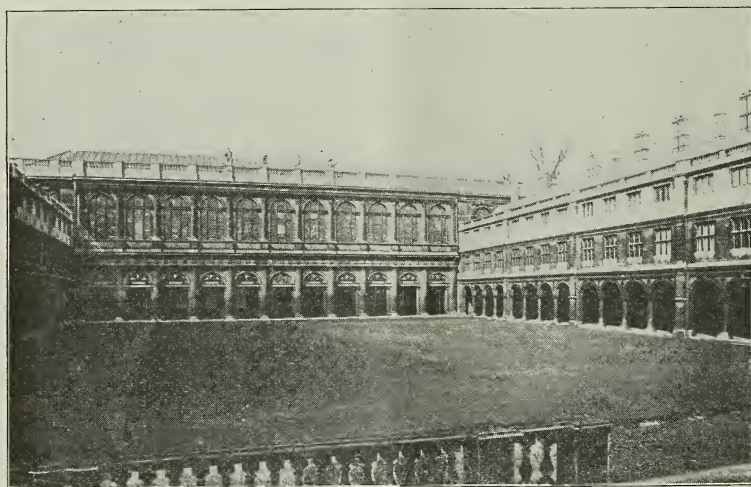
Oxford and Cambridge

PROF. ALFRED VIVIAN
Now Abroad

EVERYONE connected with an educational institution, either as teacher or student, is interested in Oxford and Cambridge Universities. These two great centers of learning have been in existence for seven or eight centuries, and make most of the other universities of Europe appear as children, and those of America as infants in swaddling clothes.

lines of study. Indeed, as this term is generally used by the students, it refers to the building in which they live rather than to the group of men.

To understand the organization of these universities it is necessary to look back a moment to their early history. The college in the first place was a group of men joined together for the purpose of employing a common



TRINITY COLLEGE AT CAMBRIDGE.

A visit to these places is replete with interest and surprises to the American. One of the first things that he notices is the difference in the meaning of the word "college" as used in America and at Oxford or Cambridge. In our country, usually, the word college, when used in connection with a university, is applied to that division of the university which offers a certain course of study. At these two famous English institutions, on the other hand, the college is the group of men living in a certain building or set of buildings and who may be following quite diverse

teacher, and in the very beginning they did not necessarily live together. At an early date men and women of wealth, for one reason or another, provided buildings for the housing of a "college." The earliest of these colleges was established in monasteries. The latter had their own peculiar type of architecture, characterized especially by the arrangement of cloisters on the four sides of an open court. When the newer buildings were erected this style of construction was adhered to, so that practically all of the college buildings at Oxford and Cambridge

have one or more open courts around which the various rooms are arranged. Indeed, the influence of these two has been so strong that nearly all the colleges and many of the schools in Great Britain are built on the same general plan.

At first Oxford and Cambridge consisted of a number of rival colleges having no connection with one another, each having its own teachers, and all teaching nearly the same subjects. The university to include all the colleges was a later creation. The introduction of the newer subjects, particularly the sciences which require expensive equipment in the way of laboratories, has done much to make the university more prominent.

Certain branches are still taught wholly within the college, but more of them are taught by university teachers and are attended by students from all the colleges. The laboratories belong to the university and all degrees are granted by the authorities of the university and not by the colleges.

The building of the colleges in the monastery style with almost blank walls on the outside and secluded open courts on the interior was in accord with the spirit of the times. The student considered himself apart from the world. He emphasized his imagined superiority over the ordinary citizen by this seclusion and by the adoption of the cap and gown, that he might by no chance be confused with the townsman.

The result was that a feeling of animosity grew up between the people of the town and the students which resulted in many conflicts between the "Town" and "Gown." In fact, it is said that even now all this feeling has not entirely disappeared, so long do old traditions cling in a country like England.

Oxford and Cambridge each consist of about twenty separate colleges. Some of them have from fifty to one hundred students, and others two or three hundred. Most of them are heavily endowed, which fund in connection with the fees paid by the students makes it possible to maintain the large buildings and splendid grounds belonging to the college. Each college has its own chapel, and in addition there is a university church as well.

To an American the colleges as now existing seem to be dormitories under careful supervision more than anything else, for most of the instruction is given outside. Each student has two or three rather small rooms in which he is served with breakfast, luncheon and afternoon tea. The dinner is the only meal served in the college dining hall.

The students are subject to very strict regulations as to deportment and general conduct. It is a serious matter to be out at night beyond the time for closing the gates. Those who cannot find apartments within the college walls or who for financial reasons must live outside, can lodge and board only at houses approved by the college, and the keepers of these houses must make daily reports to the authorities regarding the hours kept by the students, etc.

No student is allowed to appear on the street without cap and gown after a certain hour in the evening nor on Sunday, and regular officers called proctors are appointed to arrest and fine them if they are caught violating this rule.

The gardens are very beautiful, but like everything else connected with the colleges, are hidden by high walls from the passer-by. At Cambridge the crowning feature is the "Backs." Nearly all the colleges back on the River Cam and as the "Backs" are beautifully planted

and the banks of the river itself are parked, the effect is wonderfully striking. A walk along the river is one of the most delightful experiences of a visit to Cambridge.

Oxford glories not only in her gardens, but in the beauty of her setting. Located in a valley surrounded with picturesque hills, and with the Isis River winding in sinuous curves, she may well feel that Nature has left little undone for her. The fact is it would be impossible to decide which is the more beautiful, Oxford or Cambridge.

Cambridge has recently added agriculture to the lines of study offered by the university. The school of agriculture has a fine new building in Cambridge and a farm about two miles dis-

tant. Some remarkable work has already been done here in plant breeding. Oxford has a school of Forestry of some note. This is all the more interesting in view of the fact that both of these institutions are ultra conservative and somewhat loath to make new departures.

Probably there is nowhere else in the world that such intense loyalty is shown by students to their alma mater as at these two universities, or rather at the colleges of these two institutions, for the student is loyal first of all to his college and in only a slightly smaller measure to his university. A little of this enthusiasm for his alma mater might well be emulated by his American cousin.



THE "BACKS" AT CAMBRIDGE.

Showing King's College Chapel.

Breeding Corn for Greater Protein Content

W. C. McQUISTON, '14

ONE of the greatest problems confronting the feeder today is how to procure enough protein in his rations at a moderate cost. Especially is this true with the man who is feeding hogs; for corn, which as a rule is the main feed for hogs, is a very wide ration, so that in order to balance the ration it becomes necessary to add mill feed, tannage and other costly forms of feed.

This naturally caused the agronomist to ask "Why not breed up the protein content of the corn kernel so that it will be a balanced, or at least a more nearly balanced ration?" When we notice what has been done with other plants by careful selection and breeding, as for example the raising of the sugar content of the sugar beet from 5 to 16 per cent, the large increase in the sugar content of sorghums etc., and when we see the great change in the structure of the corn plant itself as carried on by the Illinois Experiment Station in breeding for high and low ears; it became apparent that such work would be worth trying.

In 1899 the Illinois Experiment Station started such an experiment. They began by selecting by chemical analysis, the highest and lowest protein ears they could find. To do this a few kernels were selected from each ear, it being found that the kernels of the same ear are about uniform in composition.

The ears highest and also those lowest in protein content were planted, each ear in an individual row, in a rather isolated field where there would be as little cross pollination as possible. Planting in individual rows gave the breeder a chance to keep track of

the offspring of each ear and should its progeny show any desirable qualities it could be saved for seed the following season.

The protein content of the ear planted the first season varied from 8.25 per cent to 13.27 per cent. At the end of the first season the difference between the average ear from the low and the average ear from the high protein plots was about 1 per cent. The highest and lowest protein ears obtainable were again selected from this stock and planted as in the previous spring, the result being a difference of 1.25 per cent at the end of the second season.

No further figures are available as to the results since that time. We have, however, the results obtained by Mr. Ralph Allen, a practical corn breeder of Illinois, which are perhaps of more decided interest to the farmer, since they show what he himself can do. Mr. Allen has at the time he reported, succeeded in securing a difference of 1.58 per cent between the high and low protein plots in three years.

This may not seem like very much, but when we figure the value of the extra protein in the corn, from the high protein plots at the market prices which we usually pay for protein in tannage, oil meal, etc., it means a difference in value of 11 cents per bu. between the two plots. Or if the corn yielded 50 bu. per acre the difference in value would be \$5.50 per acre. We must remember, too, that this is the result of only three years' work, or in other words, just a mere start on the change which we should be able to accomplish.

The question which the practical

farmer asks himself is, "Will it pay me to breed for a high protein corn?" Perhaps it is not practical for the average farmer. But for the man who makes a speciality of breeding corn of a high type, it surely is worth his while to strive towards a higher protein content as well as toward a higher yield, especially since it has been found that the high and low protein ears can be distinguished without a chemical analysis.

There are two kinds of starch in the corn kernel, the hard flinty, more or less vitreous layer of the outside, and within, a layer of soft white starch. The former is generally known as horny starch and the latter as soft or white starch. It has been found that in those kernels which show a predominance of

the horny starch over the white starch, we find always a high protein content, to select then, ears which have a high protein content, it is only necessary to split the kernel both ways with a knife so that we can see the proportion of the two starches.

To those who are not so situated as to make it practical to breed their corn for higher protein content, here is a practical question.

If a seed corn breeder has a strain of corn whose protein content is 1.5 per cent higher than your own, or if in other words, his corn is worth as we have figured before 11 cents more per bushel or \$5.50 per acre, and a bushel of seed plants 8 acres of corn, how much could you afford to pay for the seed?



Comparison of Crop Production in Germany and America

HOMER C. PRICE
Dean of College of Agriculture

THE United States has the enormous production of between four and five billion bushels of grain of all kinds each year. The last census has shown that while our population is rapidly increasing our grain production is practically standing still and the number of bushels of grain produced per capita is rapidly decreasing. While our population increased 21 per cent during the last decade our area of cultivated land only increased $3\frac{1}{2}$ per cent during the same period and our total production of grain only $11\frac{1}{2}$ per cent. In 1899 the average annual production of cereal crops was 58.4 bushels per capita and in 1909 it was only 49.1 bushels.

In Germany the situation has been very much different during the same period. Germany's cultivated land has long been occupied and the only possibility of increasing their crop production has been by increasing the yields per acre. To accomplish this they have used commercial fertilizers and improved their methods of cultivation but above all have used plant breeding to produce more productive varieties.

It is difficult to measure just how effective their work in plant breeding has been in this respect and to know how much of the increase in yields should be attributed to plant breeding and how much to other causes. However in the case of the sugar beet which is one of the important farm crops of Germany the increase in sugar content is directly due to plant breeding. Here is an opportunity to measure quite accurately the results of plant breeding as applied to a farm crop. Beginning

with a beet that did not contain over 5 per cent sugar, the sugar content has been raised to 25 per cent in individual cases in less than a century.

The average sugar content of the beet crop of Germany by decades is shown in the following table.

Year	Sugar Content
1838	8.8%
1848	9.8%
1858	10.1%
1868	10.1%
1878	11.7%
1888	13.7%
1898	15.2%
1908	17.0%

While the increase in yields of other farm crops cannot be as clearly assigned to plant breeding as in the case of the sugar beet still it is no less marked. A comparison of yields between single years is of little value because one year the crop may be abnormal, due to the season, but by taking an average for a period of years a representative yield is given that is a safe basis for comparison. By taking the government statistics of Germany and making a comparison between the average yields for the ten years from 1883 to 1892 and for five years from 1906 to 1910 they show the following increases in crop yields have been secured by the German farmers within twenty years.

Average Yield Per Acre

Crop.	Period, 1883-92	Period, 1906-10.	Inc. in 20 Yrs.
Wheat ...	21.2 bu.	31.3 bu.	47.8%
Rye	16.6 bu.	28.3 bu.	70. %
Oats	34.1 bu.	57.5 bu.	68.4%
Barley ...	25.5 bu.	37.5 bu.	49.6%
Potatoes..	130. bu.	210.1 bu.	61.6%

Practically the same figures for the United States present a very different picture. Our yields are not only in most cases less than one half what they are in Germany, but the per centage of increase has been very much less as shown by the following table:—

Average Yield Per Acre

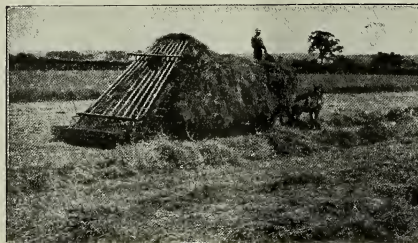
Crop.	Period, 1886-95	Period, 1906-10	Inc. in 18 Yrs.
Wheat ...	12.7 bu.	14.7 bu.	15.7%
Rye	12.7 bu.	16.4 bu.	29. %
Oats	25.6 bu.	29.0 bu.	13.3%
Barley ...	22.6 bu.	24.6 bu.	9. %
Potatoes..	73.2 bu.	96.9 bu.	32.4%

While the yield of wheat per acre in Germany has increased 10 per cent in twenty years, in the United States it has only increased 15.7 per cent notwithstanding the fact that the yield in Germany is over twice as great as in America. A comparison of the tables will show that what is true of the wheat crop is true of the other crop yields. The German farmer is not only producing much more on the same area, but he is increasing his yield much more rapidly than the American farmer.

The German farmer has not reached

his limit of production by any means, in the opinion of the leading agriculturists. Director Wohltmann of the Agricultural Institute of the University of Halle said recently in a public address that he was confident that German farmers could increase their present yields 40 per cent within the next 20 years but that it was his opinion that the increase would come principally as the results of plant breeding; that he thought the German farmer had about reached his limit of what could be accomplished from cultivation and fertilization.

The pessimists who predict the rapidly approaching time when the farmers of the United States will not be able to produce enough for our own needs, overlook the possibility of increasing the production from our own area as Germany has done. We have the possibility of doubling our crop yields by adopting better methods of cultivation and fertilization, and when we add to that the possibilities of increase through breeding more productive varieties we postpone the evil day when we will not be able to produce our own food supply, generations if not centuries.



Picturesque Ohio -- II.

HOLLIS KIGHT

IN the present series of illustrated articles under the title of "Picturesque Ohio" no elaborate effort will be made to go beyond the real facts as suggested by the views accompanying each article. In other words, the text will not attempt to tell more than the pictures and will treat them merely in a cursory manner sufficient to identify them and casually point out any subjects of special interest which may be timely in connection with them. The camera, for the most part, will be left to tell its own story. So far as possible, however, the views will be limited to such as are typical and peculiarly Ohioan.

The precedence of the Buckeye state in picturesque interest does not require any invidious comparisons with other and neighboring regions, but it hardly fails to impress itself on the traveler familiar with the physical attractions

of the Middle West. Perhaps the only typical American landscape on the soil of Ohio is the prairie, but, since the states that are richer in these expansive views are most delinquent in others more attractive, the Ohioan may well be satisfied with the single deprivation which Nature has inflicted upon his native commonwealth.

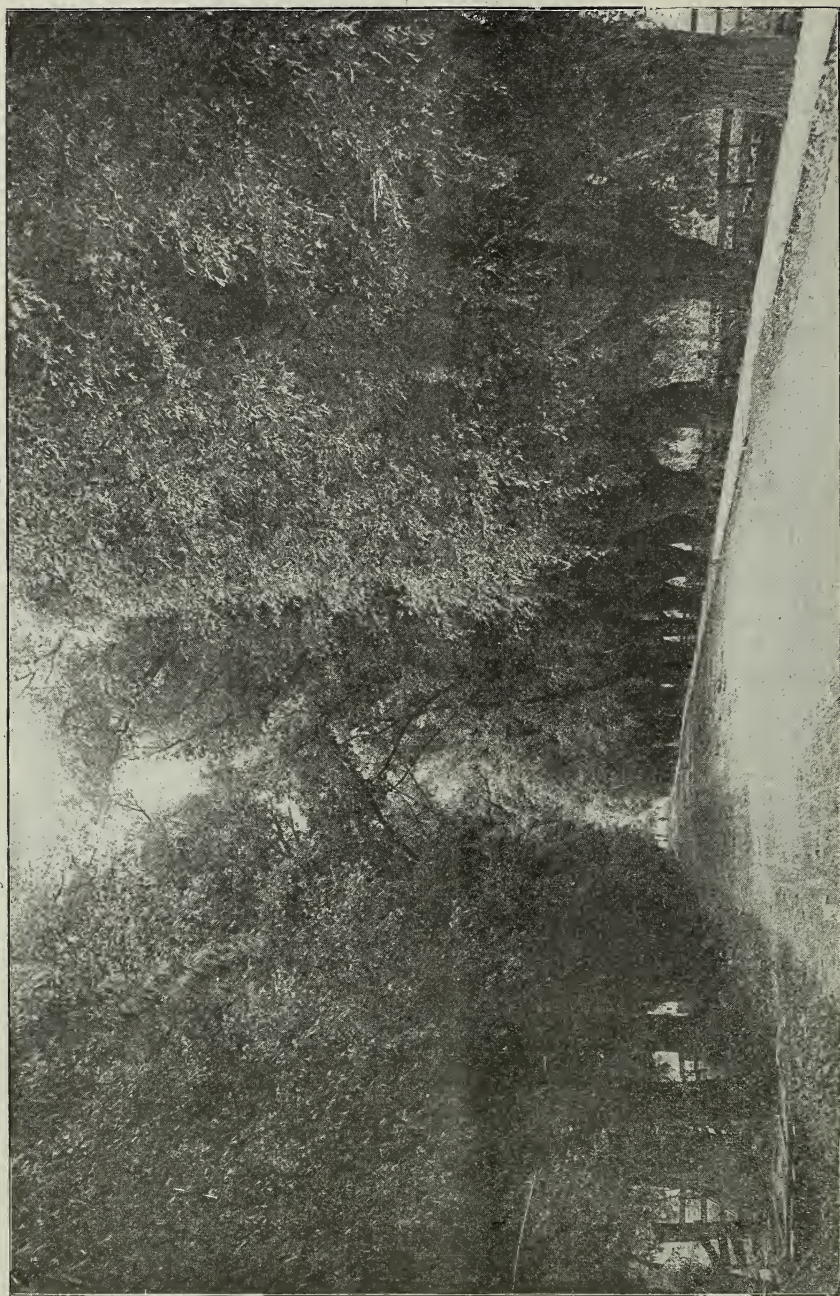
* * *

The Ohio boundary of Lake Erie affords indefinite material for the artist with camera or brush, whether inspired by a scene of placid loveliness or one of imposing grandeur. No softer effects are to be obtained in this region than those by the photographer of artistic temperament at dusk, by moonlight or at dawn. An exceptionally fine study of an evening scene on the shores of the lake is that by Mr. Andrew Emerine, Jr., of Fostoria, taken at a point near Vermillion, Ohio, accompanying



SUNSET ON LAKE ERIE, NEAR VERMILLION, O.

Photo by Andrew Emerine, Jr., Fostoria, O.



“WILLOW DRIVE,” NEAR URBANA.

Photo by H. B. Convers.



OLD WATERING TROUGH, NEAR COSHOCTON.

Photo by L. A. Dozer, Bucyrus.

the present article. The artist has caught the beauty of eventide with singular fidelity, and the dusky human figures introduced in the picture add to its charm of naturalness. Mr. Ermine has appropriately named this study, "The Longest Day at Last Bows Down to Evening."

What is known as "Urbana's Pride" is the "Willow Drive," presenting a magnificent vista of giant willow trees, sixty or more years old, leading to the cemetery of Champaign county's thriving capital. Mr. H. B. Conyers of Urbana has made a very effective picture of this celebrated driveway, something more than a half mile in extent. The majestic arch of these trees is perhaps unsurpassed in Ohio, if anywhere else.

The eternal controversy over the canals of Ohio—whether to retain or dispose of them—might well be settled in favor of their retention, if no better

reason presents itself, on the ground that their abandonment would sacrifice many beautiful landscapes in various parts of the state penetrated by these waterways. If their commercial value has been lost, their artistic worth has not been. Ohio can testify that, in a picturesque country, a canal abandoned by commerce can enhance the beauty of the natural landscape after a fashion peculiarly its own and not in the same manner as a natural stream. Its foliage is not of the banks alone, but of the waterway itself, and varies with the season of the year, in flowers of white and yellow and floating massive leaves of green. A typical canal scene of this character is the accompanying photograph by Mr. L. E. Martindale of St. Mary's, as shown in our frontispiece.

The old watering trough, like the covered bridge, is fast falling into dis-

use, and unlike the latter, is giving place to no substitute. It will probably never be done away with altogether—at least not until the horse has passed wholly into innocuous desuetude; but with electric traction lines spreading out in all directions and the automobile becoming a common vehicle on country roads, the old watering trough of other and less progressive days is becoming a rarity. Happily its race is not quite ended, and it is still the center of many a picturesque scene along Ohio roads. What memories it recalls, what history it might relate, would be themes for a poet, indeed. The most significant of the specimens still remaining are well typified by the accom-

panying photograph by Mr. C. M. Hay, taken on what is popularly known as the "Seven Mile Drive" near Coshocton.

Presently we shall pass on to more imposing but not more impressive scenes. Ohio scenery is as prolific in grandeur as in quietude. It is by no means confined to an interpretation of Nature's gentler moods. Its most rugged temperament is perhaps its least known, but it is nevertheless readily discovered. It is this contrast between the wonders of mighty works and Nature's calm, that makes "Picturesque Ohio" truly deserving the name.

But this is anticipating—and that is not always the part of wisdom.



THE LAKE REGION OF NORTHEASTERN OHIO.

"The Three Spots."

LEO E. MELCHERS

Plant Pathologist, Ohio Experiment Station

THE apple like the rest of us, "gets spotted" at times, when it is least expected.

This pome fruit has three enemies among our plant diseases, which on some occasions are not easily distinguished from each other. Two of these are caused by fungi and the other is in all probability a physiological trouble; unfortunately we have all three present in Ohio this fall.

The Blotch or the Arkansas Blotch, as it is sometimes called and the Fruit Spot are caused by parasitic fungi, while the true Baldwin Spot seems to be of a physiological nature and not the result of a fungus.

Without the aid of accompanying illustrations, it will be somewhat of a task to familiarize the reader with these diseases, so as to enable him to distinguish these troubles off handed; in fact it requires careful microscopic examination to determine them positively.

The Blotch is not hard to separate from the other two. On the fruit, the spots appear as jagged, irregular, brownish-black blotches, varying in size from 2 to 20 m. m. The spots may coalesce so as to cover nearly the entire fruit. With the naked eye or by the aid of a hand lense, you will notice minute, little, pimple like, black bodies, called pycnidia. These contain spores. They occur singly or in groups, scattered promiscuously over the surface of the apple. The spots are not sunken and only slightly rough.

This disease is quite common in the southern and central parts of the State and frequently causes considerable

damage. Apples attacked, are injured as far as their sale is concerned, on account of their appearance, but as a rule no decay results. This disease is sometimes confused with the Sooty or Fly-speck fungus, but here we do not have such a definite pycnidium and the mycelial threads are simply a superficial growth and can easily be scraped or rubbed off from the host.

The Fruit Spot and the Baldwin Spot have been badly confused and misnamed, even in some of our most recent literature on Plant Diseases. The two troubles are quite similar in appearance and it often times becomes quite a task to distinguish them without the use of a microscope and even then it is not without difficulty, for although the threads of the fungus may be present, (in the case of the Fruit Spot), it requires careful staining to make them conspicuous.

The causal fungus of the Fruit Spot has been known as, *Cylindrosporium Pomi*,—Brooks, but recent investigations show that it is brought about by *Phoma Pomi*,—Passer, and it is this disease which is common on such varieties as, Celestra, N. Spy, Jonathan, Talman Sweet, Baldwin, etc. This disease has been found in Ohio, New York, Canada, Delaware, Maine, Michigan, Pennsylvania, New Hampshire and some other States. This same fungus may occur on the quince but does not seem to be common. Just recently the writer found this fungus causing the spots on quinces sent in from Marietta; this is the first of its kind that has been reported at our Station. This disease is not the true Baldwin Spot which has

been erroneously published and which has resulted in considerable confusion of names.

The symptoms of the Fruit Spot are the appearance of small red dots or spots, usually at the lenticels or breathing pores. These occur about the middle of July or later when lenticel infection is most favorable. The spots increase in size slowly and change to a dark brown color and become slightly depressed at picking time or while in storage. The spots vary in size from 2 to 10 m. m. or even larger when they have been in storage for a time. There does not seem to be any definite shape but their outline as a rule is elliptical or slightly angular. The tissue beneath these spots is corky and brown for a thickness of several m m. This is easily seen by cutting below an affected area. Apples in this condition are no better than culls and often times they go into storage in an apparently healthy condition, but they come out a spotted mass.

The true Baldwin Spot which has been called, the Fruit Spot, Bitter Pit, Baldwin Spot, Fruit Pit, Fruit Speck, Stippen, etc., is not a new trouble, but has been known for about thirty years. It has been reported in the United States, Canada, Australia, Germany and South Africa.

In our orchard here at the Experiment Station, this season, it has been found on the Baldwin, Grimes, Langford, Fallawater, Wealthy, Vandevere and Moyer. It does not always make its appearance as early as this but seems to develop mainly after it is in storage.

As stated above, it is somewhat like the Phoma Pomi spot in general appearance, but upon closer observance one will note some distinct characteristics. The spots in their earlier stages remind one of a bruise, slightly depressed but

they do not show a discoloration, until later. When they occur on light colored fruits such as the Grimes, they retain a kind of dark green, unripened color, while the surrounding skin takes its natural color. On red varieties, the spots assume the same bruised and slightly depressed appearance, but the spots are of a darker red, dingy color. As the disease advances the spots situated close together, coalesce into a kind of pit. If you cut below these areas you get that corky, brown, discolored tissue, which is composed of cells that have collapsed and died. The submerged corky areas are found usually beneath each spot, but not always; while on the other hand you may find them below the epidermis where there is no superficial spot. These same areas may be found anywhere along the vascular system and the best way to see these characteristics is to cut an apple in two.

The cause of this disease is not fully known. It is known however, not to be the work of fungi or bacteria. A number of theories have been expounded, which deal with excessive evaporation and absorption, accumulation of certain acids and salts in definite regions, and as a result, cells composing this particular region are destroyed and broken down. We know that at times it becomes a serious trouble and we have no hope in combating it by spraying.

Treatment For the Three Spots.

Apple Blotch: Besides the two sprays which are given at the time you spray for the codling worm, it becomes necessary to use the Bordeaux Mixture or lime and sulphur (summer strength), about the beginning of July and at intervals of two weeks if other applications are necessary. It must be kept in mind that these sprays are used as a preven-

tative, for it is too late to do good if the spots have made their appearance.

Fruit Spot (*Phoma Pomi Passer*): It has been found that Bordeaux Mixture or lime and sulphur, applied on or before the middle of July, will produce encouraging results. As far as spots showing at picking time are concerned, our orchard results show the following figures:—

Trees unsprayed showed about 45 per cent diseased apples; those having been sprayed with the Bordeaux Mixture showed about 4 per cent spotted; those treated with the lime and sulphur showed about 9 per cent diseased. Two summer sprays were given with a fungicide. Experiments are to be con-

ducted this winter to see what effect paper wrappers will have; what results will be obtained by packing unwrapped and wrapped apples, and the use of the open crate.

Baldwin Spot: For this trouble we have no treatment thus far. Some varieties seem more susceptible to this spotting than others and some seasons it seems more prevalent.

No literature pertaining to these diseases in detail has been published by the Department of Botany thus far.

I might say that if any one is particularly interested in plant pathology and physiology and wishes to attack a problem, by which he can "get into press," then let him solve the Baldwin Spot.

Importance of Good Seed Corn

ABRAHAM WILLIAMS, '14

IN passing through the country at that season when corn is still but a few inches high, one sees all too frequently the lack of a good stand of young plants. Often plants of different ages are seen, giving evidence of that discouraging task of "planting in": the thought often comes to mind that such farming is surely unprofitable business. No wonder such a farmer is discouraged and becomes slipshod in his methods, for does it not cost just as much to prepare the seed bed, tend, and harvest a poor stand of corn as for a good stand? Good seed then, has an important bearing upon the succeeding crop of corn.

Many times the failure of the corn crop is unjustly attributed to the seed used. How often it is said, "Well, the seed in that south field wasn't good," when in truth no seed would have germinated properly in the undrained,

cold soil. Neither can seed selection make up for a lack of fertility of the soil nor for lack of correct methods of cultivation.

When we stop to consider that the average production of corn per acre in the United States is about 26 bushels, and that the average of the corn belt states is less than 50 bushels per acre, to produce the two and one half billion bushels each year, must involve an extensive industry. Looking again at the low average yield it is evident that there is room for great strides in increasing the yield of our corn crop. An increase of yield of 1 per cent would add 25 million dollars to the income of the farmers of the United States; while an increase of one bushel per acre would add 50 million dollars to the value of our corn crop. But before these possibilities can be realized there must be fewer farmers who go to the

crib and select their corn at planting time.

May not the careless farmer who has failed to provide himself with selected and tested seed, purchase his supply from those who make a regular business of breeding and storing corn, and thereby save all the bother of selecting and testing? He can, but there are objections to this. One reason is because it is cheaper to save it. Another reason is because the ability to germinate well is not the only desirable characteristic of good seed. It must also be adapted to its environment. Consequently the purchased variety is attended with greater uncertainty in this respect, especially if the corn has been grown at a great distance away, or in a different soil type, or if there be much change in latitude. Much harm has been done by sending away to some distant point for seed, thinking that new seed would give added vigor to the crop. There is another reason why seed should be selected and cared for from the standing corn, besides that of increased yield. The supply of seed, for various reasons, often runs short, then of course the farmer has no other course but to go to

the crib; a practice attended with certain disastrous results.

Many farmers leave the breeding of seed corn to those who have superior ability and can conduct it on a business scale, thinking they have not the ability and understanding necessary to successfully carry on the task. Even though some one else is better equipped in technical knowledge and business appliances, is it not highly important, for the reasons shown above, for every farmer to grow, select and properly care for his own seed corn?

Were it not for the binding power of tradition, agricultural improvement would step forward and keep pace with that industrial growth which has marked the development of the American cities; helping to keep the balance more evenly distributed between country and city. Then, as farmers shall we not shake off the shackles of the past and improve our agriculture in this one important respect by looking forward from harvest time to seed time, also, instead of only from seed time to harvest, and by so doing help ourselves, as well as adding to the majesty of the greatest crop of modern times.



GOOD SEED CORN.

Relative Merits of Cow Peas and Soy Beans

MAHLON YODER
Department of Agronomy

THE growing interest which farmers are showing in cow peas and soy beans seems to be due to at least four factors, viz: (1) their value as soil renovators, (2) their productiveness, (3) their high feeding value, and (4) the frequency of clover failures.

When properly inoculated, cow peas and soy beans are superior to clover as nitrogen gatherers if the amount gathered for a given length of time is considered. Both crops so improve the physical condition of the soils on which they grow that even clay soils need only a little disking to form a good seed bed for wheat. In the degree of soil improvement for a given length of time, cow peas and soy beans are hardly equaled as soil renovators.

With proper cultivation cow peas and soy beans have yielded from three to five tons of hay per acre. For grain production the soy bean is especially valuable. Soy beans yield from twenty to twenty-five bushels of beans per acre on land which is capable of producing a crop of corn yielding sixty bushels per acre. With such yields and present prices soy beans make a valuable crop for grain purposes.

Cow peas and soy beans not only furnish highly nutritious feeds for our domestic animals, but the grain is also useful as a human food. The feeding value of the forage is nearly equal to that of clover itself. Two or three parts of corn cut up with one part of cow pea or soy bean forage for silage forms a feed which is richer in protein than silage from corn alone.

The soy bean is especially valuable as a concentrate in the form of soy bean meal for hogs and dairy cattle.

Experiments have demonstrated soy bean meal to be superior to oil meal for the production of economical gains in hogs, and equal to cotton seed meal as a feed for dairy cattle. To the stockman and dairyman soy beans are especially valuable because of the high feeding value of the beans.

Frequent clover failures have been a menace to many cropping systems. In order to add stability to their cropping systems, farmers are beginning to use cow peas or soy beans as emergency leguminous crops in case of clover failures. As these legumes are less likely to fail because of poor soils or unfavorable weather conditions, they can generally be depended upon to produce fairly good crops when substituted for clover in this way. Field observations have shown soy beans to be quite resistant to droughts and cow peas to thrive on soils which are too sour and wet to grow clover. Even though these hardy qualities cause them to be quite successful when grown under such unfavorable conditions, they will also begin to fail if the soils are not supplied with potash and phosphorus. It is largely because of the failure to supply these mineral plant foods to the soil that clover failures are so frequent. It is because they grow more rapidly than clover and show greater hardiness, that cow peas and soy beans make desirable substitutes for clover when the latter fails.

Even though cow peas and soy beans have in common many features which make them valuable crops, both legumes have characteristics and habits of growth which cause a difference in the universality of their usefulness and

a superiority of one over the other. The cow pea may be considered superior to the soy bean in two respects; firstly, it does not need special inoculation when grown on soils which have not previously grown it, and, secondly, the more pronounced vining habit of a large number of cow pea varieties make this legume more desirable to grow with corn for silage.

On the other hand, the soy bean may be considered superior to the cow pea in that (1) it is adapted to more northern latitudes, (2) it is more easily threshed and cured for hay, (3) its seed endures more exposure to weather, and (4) the yields of grain are larger.

Since the soy bean has earlier maturing varieties, its use in the northern parts of the corn belt is more successful. The soy bean produces seed where the cow pea is valuable only for forage or green manuring purposes. This fact has caused experiment stations to recommend the growing of cow peas for seed purposes only in the southern latitudes of the corn belt. Because of its adaption to a wider range of latitude, the soy bean is the more successful crop for the corn belt.

Difficulty is experienced in harvesting cow peas for seed. The pods must be picked, and hand picking seems at present to be the most successful method. The splitting of the peas when threshed by means of a threshing machine is very objectionable. Soy beans on the other hand split much less when threshed in that way.

Because of the vining habit of many varieties of the cow pea, curing for hay is made difficult. It is due to this same habit that the handling of cow pea forage or hay is made less easy than that of soy beans.

For hog pasturage the soy bean is superior not only because of greater

yields of grain of a higher feeding value, but also because the beans endure more exposure to weather. This hardiness of the soy bean is important when the harvested crop is exposed to unfavorable weather at threshing time.

In considering the appropriate places of cow peas and soy beans in our cropping systems it should be kept in mind that soy beans may be grown quite successfully where corn is grown, and that cow peas are not generally successful for seed purposes farther north than the central part of the corn belt. For green manuring or forage purposes, however, the usefulness of the cow pea extends well into the northern latitudes of the corn belt. In any corn belt rotation, therefore, which admits of the use of cow peas and soy beans, one or the other of them will be found quite useful.

Cow peas or soy beans may be profitably substituted for oats on farms where the latter are a poor crop. Whether grown for hay or for grain, these legumes yield a product which is superior to oats in feeding value. They can be grown successfully on poorer soils than oats, and they have the further advantage of improving the land by adding nitrogen and bettering the tilth of the land. The seed bed for wheat is prepared more easily and cheaply when this crop follows cow peas or soy beans than when it follows oats.

When it is desired to grow cow peas or soy beans for use with corn as silage two methods may be followed. The legumes may be grown separately or a vining variety of the cow peas may be planted with corn by using a bean planting attachment on the corn planter. Cow peas are especially adapted for the latter method, as the vining is more pronounced when grown with

corn in this way. At cutting time much of the cow pea growth will be entwined about the corn so that cutting with a corn binder will remove with the corn much of the leguminous

growth. The cow pea forage which remains will be of value as pasture for hogs; or, even if not pastured, it is by no means an item of waste as it will be of manurial value to the land.

Corn Smut

WILLIAM BUENTE, '14

CORN smut is known wherever the corn plant is grown. Smut occurs on tassel, ear, leaves, stem and brace roots, but it is most conspicuous on the ear and tassel. The damage inflicted upon corn is estimated by some to be one per cent of the ears. However the plant suffers a loss in vigor after infection which may amount to a loss of one per cent of the crop. The loss varies however and in exceptional cases may be as much as two thirds of the entire crop.

Corn smut is a fungus disease and the fungi are known in science as *Ustilago zeae*. Infection occurs through the tender growing parts of the plant and a matured plant is not subject to infection. The first sign of the disease is a white glistening area covered by a white membrane. These areas grow larger and often cause enormous enlargements of the infected parts. If one of these infected areas is cut open, white, thread-like filaments are seen penetrating the tissue of the host, which draw nourishment from the plant and result in weakening it. On maturing this fungus produces myriads of black spores, which appear as a mass of black powder. When the spores mature, the membrane inclosing them, bursts and the spores are scattered. It has been demonstrated that the plant is not affected alone by the spores on the seed, since fields planted with infected seed yield as much as those fields plant-

ed with uninfected seed. Therefore it is seen that the treatment of the seed would be of no value and we must look elsewhere for a means of control. Corn smut however differs from most other smuts in that infected seed is not the most important source of infection of the plant. Infection occurs when the spores under suitable conditions of moisture come in contact with the tender growing portions of the plant. Plants are rarely infected before they attain the height of one foot.

Stable manure is one known source of infection. Corn fields which have recently been manured are usually more liable to infection. Manure free from the spores of this disease is of benefit to the crop but the manure from seriously affected farms usually contains numerous spores because smutty corn is fed to the livestock and thus the spores find their way into the manure without any loss in vitality. Therefore it would not be wise to spread such manure on new land or uninfected land. The best and most practical method of control is to inspect all plants several times during the season and to remove all infected plants or portions which are infected. These diseased plants should be burned and not thrown upon the compost heap for if this is done the spores will again be returned to the field. By continuing this method the disease can be reasonably controlled.

The Dairy Team's Trip

S. M. SALISBURY, '13

The fifth annual judging contest of dairy cattle was held at the National Dairy Show, October 25th. Fourteen teams representing as many agricultural colleges participated, making this the largest contest ever held. Seven rings of cattle were judged. A ring each of Jersey, Guernsey and Holstein bulls and cows, and a ring of Ayrshire cows were brought before the contestants.

Nebraska Agricultural College had the winning team with Iowa a close second. Kansas, Massachusetts and Missouri followed in order. The Ohio team was twelfth. This should be sufficient to impress all the men interested in animal husbandry and dairying with the fact that too few men offer themselves as candidates for the team.

This limit of material is not conducive to a first class team and only such teams can compete successfully with colleges having many individuals from whom they may select those who are to represent them.

The team left Columbus on Monday

night previous to the contest for a two day trip in northern Ohio. Two herds were visited, the Anna Dean Farm Guernseys and the South Farm Ayrshires.

Tuesday was spent at Mr. Barber's Anna Dean Farm at Barberton. Here we found a wonderful herd of Guernseys. As one viewed the long rows of cows he was struck at once with uniformity and character of the breed as shown there. The general appearance of the stable and the cows gave proof of the excellent care they receive. Many lessons were learned that day from Messrs. Murphy and Gocheral who took time and pains to show us the best at hand. At noon we were entertained by Mr. Barber at his mansion. An enjoyable time was spent with the man who will make Guernseys more famous than they now are.

Wednesday morning Mr. John Sherwin, the owner of South Farm, met the team at Cleveland and took them by auto to his farm at Willoughby.

Mr. Sherwin is a prominent banker



of Cleveland, who has time to enjoy a beautiful farmstead and a first class herd of Ayrshire cattle. A few years ago he became interested in this herd and started to build the best herd in this country. To say that he is succeeding does not express the fact strongly enough. There is the home of White Lily, the champion milk producer of all breeds as a two year old.

Spicy John, a noted Ayrshire bull also occupies a stall at this farm and so on down the list we find the best owned anywhere.

A great Ayrshire show was staged there for us. Breed character and type of that great Scotch breed were brought out to the fullest extent. While Mr. Sherwin was interested in giving the 1912 team an excellent show of Ayrshires he was not forgetful of future teams from Ohio State for he presented the College of Agriculture with a beautiful bull calf, sired by Spicy John and out of one of his best cows. For this gift every student in the college will be grateful.

Our college is indeed fortunate in having such a loyal supporter of its live stock interests as this man who

shares his best with us. And he in turn is fortunate in having a helpmate so interested in the herd and so capable of helping solve its problems as Mrs. Sherwin.

From this farm the team went to Chicago. One day was given over to the contest. The next was spent about the great dairy show. Surely times are prosperous for the breeder of pure bred dairy cattle, else this show could not have been. Guernseys seemed to be the best represented. Jerseys were there in form. Among the Holsteins we found the herd of Derrer Bros., who have been so kind to dairy judging classes from Ohio State. The smallest dairy breed, the Kerry, was represented by two herds.

The commercial side of the dairy business was not neglected. Machinery of all kinds, from stanchions to milk separators, was in abundance. Even the man with the "best on earth" was there.

Time was limited and a careful study of the exhibit could not be made.

In the evening athletic games, the judging of milk and butter, dairying outfits and the frolic of the calves furnished entertainment.



The Average Farmer

GEO. LIVINGSTON

Assitant Professor of Agronomy

THE term "average farmer" is frequently employed by speakers and writers on Agricultural topics, in making comparisons or recommending farm practices. Since he is used as a standard, it is interesting to know therefore, what the average Ohio farmer is doing, and what is to be expected of him. How much land does he till? What is the value of his possessions? What yield of grain and hay does he obtain per acre? The Thirteenth Census Report on Ohio Agriculture presents some interesting information in this connection.

The report shows that 92.5 per cent of the total land area of Ohio is in farms, but only 79.8 per cent of the total is improved land. These farms vary in size from three to several thousand acres. The average size of the Ohio farm has decreased from 125 acres in 1850 to 88.6 acres in 1910. The average farmer of today then is living on a farm of 88.6 acres, 70.7 acres of which may be regarded as improved land.

Using the county as a unit, the value per acre varies from \$10 in some of the south eastern counties of the state, to \$160 in Cuyahoga county. The value of the average farm, not including buildings and equipment, using the State as a unit, is \$53.34 per acre. The land value of the average farm therefore is \$4,726. The average value of the farm buildings is \$1354 which, added to the \$4726, gives \$6080, which represents the value of land and buildings. This makes the per acre value of the land and buildings \$68.62. Twenty nine per cent of the farms of Ohio are mortgaged, the average indebtedness

per farm being \$1491.00. Therefore, twenty nine out of each one hundred farmers have a mortgage of \$1491 on their farms, or the average farmer has an indebtedness of \$428.29. It is interesting to note in this connection, that the average debt per farm has increased from \$1313 in 1890 to \$1491 in 1910, or an increase of 13.6 per cent, while the average value of the farm has increased 34 per cent. Thus the owner has increased his equity from \$2516 to \$3669 or 45.8 per cent. Therefore the greater relative increase in farm values than in farm debts, has resulted in a decrease in the indebtedness of from 34.3 per cent in 1890 to 28.9 per cent in 1910. The farmer has made a good rate of interest on the borrowed capital by the rise in land values.

Fifty per cent of the farmers of the state employ hired help, and the average expenditure for this being \$35.16. The average farmer therefore pays out \$88 for hired help and \$14.06 for commercial fertilizer each year. The average value of the implements and machinery on the farms of the state is \$188. The average value of the live-stock per farm is \$725. Seventy six per cent of this amount is invested in horses and cattle, 9.8 per cent in hogs, 7.6 per cent in sheep, and 4.8 per cent in poultry. Ninety five per cent of the farms report live stock, 89 per cent report cattle. 89 per cent horses, 4 per cent mules 70 per cent hogs, 26 per cent sheep and 93 per cent poultry..

The leading crops of the state in order of the value are corn, hay and forage, wheat, oats, potatoes and tobacco. The per cent of farms recording corn is 85.7, wheat 50.2, oats 55.2, hay and for-

age 74.6, potatoes 73.3, tobacco 8.5 and rye 3.8. The average yield per acre for corn is reported as 40.2 bu., for wheat 16.8, oats 32.2, potatoes 95, and tobacco 831 lbs.

The average farmer of Ohio, as near as can be determined, would report the following possessions and yields per acre.

Farm land: Total size, 88.6 acres; Improved land, 70.7 acres; Land value,

\$4726.00; value per acre \$53.34; Value of buildings, \$1354.00; Value of land and buildings, \$6080.00; Value per acre, \$68.62; Implements and machinery, \$188.00; Live stock, \$725.00; Total value of farm and equipment, \$6994.00; Mortgage, \$428.00.

Yield of Field Crops per acre: Corn, 40.2 bu.; Wheat, 16.8 bu.; Oats, 32.2 bu.; Hay, 1.3 tons; Potatoes 95.0 bu.

Help and Fertilizer per year: Fertilizer, \$14.06; Help \$88.00.



NINETY-TWO AND ONE-HALF PER CENT OF OHIO'S AREA IS IN FARMS, THE SOIL TYPES VARYING IN GENERAL AS HERE INDICATED.



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COLUMBUS, OHIO, NOVEMBER, 1912.

Editorial

In glancing over these pages we are constantly reminded of the depth of our indebtedness to the many men, both professional and those occupying executive positions with various business organizations, who have given so liberally of their time and material assistance in helping this publication to secure whatever measure of success it has been its privilege to attain.

Such generosity demands of us a reciprocal expenditure of energy and effort and it is our pleasure to give freely of the best at our command, toward the ultimate aim of producing a publication in some degree worthy of the illustrious State and the magnificent institution which we represent.

Those deserving special mention, in addition to our contributors and staff members, are The Livingston Seed Co.,

The Agricultural Extension Department, The International Harvester Co., and the Indianola Printing Co.

The success of the crops number last year has led us to attempt a similar number with this issue. **THE CROPS NUMBER** Surely no subject deserves greater attention nor is there any one branch of agricultural progress which offers greater opportunities for development than that of the improvement of farm crops. When we think for instance what it would mean to a hungering world to be able to produce one more bushel of wheat per acre, to grow alfalfa instead of timothy, or to breed disease resistant varieties of the various crops, we feel that however minute the influence our special number may have toward greater efforts along these lines, even so it is well worth the time and energy spent.

Get your ticket and your pass and be ready to go with the crowd when the train pulls out for the **THE INTER-** Live Stock Exposition **NATIONAL.** at Chicago on November the 30th. This annual event of international importance holds opportunities for information as well as inspiration which you should grasp if at all possible. It is a kind of final round up—a supreme contest of all the winners at the various State Fairs. The foreign winners will be there. The owners and breeders, the foremost Animal Husbandrymen of the United States, the picked college men on the judging teams, the enthusiastic student delegations from all the colleges—all will be there gathered round the ringside and keyed to the pitch of enthusiasm which pervades the whole.

Better arrange to be there when the blue ribbons are pinned on.

Our agricultural colleges have been criticized because they have graduated so few farmers. It is **WE ARE** argued against us that **CRITICIZED** the agricultural colleges do not teach farming but simply about farming; that our graduates do not go back home to run the old farm but usually drift into "professional" work.

Let us answer in the first place, that however just this criticism may have been of the past, the tendency is certainly in the other direction at the present time. While it is true that about one half of our graduates still go into professional work for the first five to ten years after leaving the college, the majority of these men do so because of the changed economic conditions which make it impossible for a young man without money to engage in profitable

agriculture until capital has been acquired—and the required capital can be more quickly gathered together in the professional lines.

But for the sake of argument suppose a large percentage of our graduates do not return to the farm, whose fault is it? Must it be charged to the college? No. The college can only do what public opinion and the student demand. Is it the fault of the student, then? No. The student in many cases finds much better financial returns awaiting him in branches of agricultural work, other than actually tilling the soil. He must have capital to run a farm according to the principles which he has adopted, and the experiment stations and other professional lines offer him the means of collecting his capital. Who then, must shoulder the blame? The farmer himself. He has not had faith enough in farming to advise young men to go to college to prepare for farming. Thanks to the development and readjustments of the last decade a great change has come about in this respect and the result is already being seen in the remarkable influx to the colleges. The change will further be shown by the increasing percentage of graduates who enter upon active farming operations immediately upon graduation—**because they come to college with that intention.** This is the only solid basis upon which any comprehensive agricultural college system can be placed and the sooner this becomes generally understood, the better for all concerned.

Once more the Day of Thanksgiving is with us. Each recurring observance of the day brings the agriculturist more to be thankful **GIVE** for. Any attempt to enumerate the multitude of ma- **THANKS.**

terial improvements which has made country life a source of joy and a cause for thanks-giving must fall far short of its final purpose, since many of the greatest improvements and changes are non-material and intangible. We must not fail to appreciate the influence of the great **change of attitude** which has swept across the land—the change in attitude of the city toward the country

and of the farmer toward his work. The city dweller's attitude of scorn has changed to one of envy. The farmer no longer looks upon his work as a daily grind from which there is no escape and but small rewards. He thinks of his farm as a factory and of himself as a manager turning raw products into food, consequently his ideas and ideals have undergone a re-



The Man With the Hoe

Bowed by the weight of centuries, he leans
Upon his hoe, and gazes on the ground,
The emptiness of ages in his face,
And on his back the burden of the world.
Who made him dead to rapture and despair,
A thing that grieves not and that never hopes,
Stolid and stunned, a brother to the ox?
Who loosened and let down his brutal jaw?
Whose was the hand that slanted back this brow?
Whose breath blew out the light within this brain?

* * * * *

Through this dread shape the suffering ages look
Time's tragedy is in that aching stoop.

* * * * *

How will you ever straighten up this shape;
Touch it again with immortality;
Give back the upward looking and the light?

—Edwin Markham.

adjustment, and his pleasure and profits have experienced a rapid change for the better.

The introduction of labor-saving machinery has undoubtedly been one of the greatest factors in bringing about this change of attitude. Our poems and pictures which follow, point out this truth more powerfully than can mere words.

Can we compare for a moment that grief-drawn face from which all hope has fled with that other soul-lighted countenance joyed by the consciousness of the accomplishment of twenty men, without offering up a prayer of thanksgiving for the changed and improved conditions under which we are permitted to labor?



The Man With the Reaper

Erect and great of soul and limb he stands
 A king amongst the kingliest of his race.
 The light of splendid dawns burns in his eyes,
 And flashes on his face a smile of pride
 And mastery and sunburnt health. His tools
 That reap and multiply the grain to feed
 The hungry multitudes are magic wands
 That make his power like unto God's. Their steel
 Has gone around the world to slay despair,
 To murder war and set at liberty
 The poor and them that were the serfs of toil;
 To hew new paths to Eden's new, where dwell
 All conquering hope and rich prosperity.
 In this new world the awakened soul of man
 Rules in a Dawn of Plenty and new life.

—Henry E. Joy.

ALUMNI WHAT THE BUSY GRADS ARE DOING

Claude B. Durham, Ag. '12, is connected with the Agricultural Experiment Station of Purdue University, Lafayette, Indiana.

Miss Elsie Leue, Ag. '12, and **George R. Rinehart**, Ag. '12, were recently married. **Mr. and Mrs. Rinehart** were both graduates of the Ohio State University. They are living at 417 South Dennison St., Ann Arbor, Mich. **Mr. Rinehart** is taking advanced work in the University of Michigan.

O. H. Pollock, Ag. '12, is managing the home farm near Delaware, Ohio.

D. R. Vanatta, Ag. '10, is farming at Stockton, Ohio.

O. A. Jamison, Ag. '12, is an assistant in the dairy department of the Michigan Agricultural College.

J. C. Hedge, Ag. '11, is manager of a creamery at Oak Hill, Ohio.

Merton Brown, '11, is teaching Agriculture in the Logan High School. **Mr. Brown** with a class of two hundred students visited the Agriculture Extension train which passed through that city October 29th.

E. C. Cotton Ag. '05, is entomologist at the College of Agriculture and Experiment Station of the University of Tennessee, located at Knoxville.

Philip L. Rothrock, Ag. '08, is Assistant in Grain Standardization in the United States Department of Agriculture.

Francis H. McGuffey, '94 is a grower and shipper of potatoes and onions. His farm is located at Conover, Ohio.

Mrs. D. H. Thomas, B. Sc. '95 and M. Sc. '96, formerly **Miss Emma Ball**,

resides at 284 East 3rd Street, Portsmouth, Ohio. **Mr. Thomas** owns and operates the Red Cross Pharmacy at that place.

W. W. Smith, Ag. '12, Superintendent of the Ohio Dairy Company at Toledo, was recently married. **Mrs. Smith** was formerly from Peoria, Ill.

Miss Leola Flory, '12, is instructor in Domestic Science at the Y. W. C. A. 65 S. Fourth St., Columbus, Ohio.

Edward R. Linn, '12, is employed as Forester for the Fitzgerald Land and Lumber Company of Johnson, Vt.

J. F. Zimmer, '09, who is connected with the United States Department of Agriculture, was recently married. **Mr. and Mrs. Zimmer** will reside at Vienna, Md.

C. R. George, Ag. '12, of the Agricultural College at Davis, Cal., writes that he enjoys his work at the institution very much, and that his schedule is light which gives him opportunity to travel over Southern California in the interest of agricultural development.

H. C. Stone, Ag. '09-10, of Mansfield, Ohio, called on a number of his former classmates October 26th and 27th. **Mr. Stone** is teaching near his home.

John R. Williams, Ex. '13, resides at Hanover, Ohio.

V. A. Place, '12, is connected with the Animal Husbandry Department of the University of Illinois.

H. E. Allen, Ag. '09, is connected with the School of Agriculture, Lafayette, Ind.

The marriage of **Miss Callie Hewit**,

of Harrisburg, Ohio, and **Mr. Harry Linebaugh**, of Grove City, took place Oct. 23. **Mr. Linebaugh** was a graduate of the '12 class.

E. D. Blaine, '12, a varsity foot-ball man, is managing a stock farm near Mt. Sterling, Ohio.

W. H. Baker, Ag. '92, resides on a farm at Chula, Mo. Mrs. Baker, formerly **Emma A. Slyh**, was also a graduate of the University in the Arts College the same year.

V. C. Smith, '12, is teaching Agriculture in the High School at LaSalle, Ill. **Mr. Smith** has an experimental plot comprising several acres under his direction.

W. A. Fischer, '97, is director of the Para Agricultural Experiment Station. He was formerly with the United States Department of Agriculture. He is also the consulting expert and technical adviser for rubber, cacao and other plantations in North Brazil.

Andrew Burns, who attended the Horticultural department of the University, was married in October. **Mr. Burns** has charge of a large farm east of Columbus, Ohio.

At the recent meeting of the National Conservation Congress held at Indianapolis, Ind., Prof. William R. Lazenby, of the Forestry Department of the Ohio State University, was elected Vice President for Ohio.

Ira J. Condit, '05, a graduate of the Department of Horticulture and Forestry, recently visited old acquaintances at the University. **Mr. Condit** for the past six years has been connected with the California Polytechnic School, located at San Luis Obispo, Cal.

Robert B. Faxon, '12, spent the past summer on "Red Top Ranch," Paonia, Colo. He was at the University a few weeks ago while on his way to Sidney,

Ohio, where he expects to take a position in landscape gardening work.

C. W. Waid, '98, is now working for the Nursery and Orchard Division of the State Board of Agriculture. He has been engaged in demonstration, spraying, pruning and preparing horticultural exhibits for fairs. **Mr. Waid** is a regular contributor to the Market Growers Journal published at Louisville, Ky.

Two graduates of the college of Agriculture, **F. W. Rane**, '91, State Forester of Massachusetts, and **E. O. Fippin**, '00, professor of soils at Cornell University, took an active part in the Fourth National Conservation Congress which was held at Indianapolis, Ind., last month.

W. P. Bentley of the class of '85 holds the distinguished honor of being the first graduate in agriculture that ever took a course at the Ohio State University. For many years **Prof. Bentley** was a missionary in China and for six years was president of the Christian Institute at Shanghai. He is at present Superintendent of the Pacific Coast Oriental Missions, and Professor of Church History, at Berkeley Seminary, California. Professor Bentley has written and published quite a number of books in Chinese. One of them which will be of particular interest to readers of the Agricultural Student is entitled, "Outlines of Scientific Agriculture."

C. W. McCullough is farming and raising stock near Steubenville, in Jefferson County.

C. N. Curtis is a horticulturist at Willoughby, Lake County.

L. U. Hill is farming in Miami Co.

Professor Thompson, '08, now of S. Dakota State University, visited the campus in connection with his trip to the Ohio State Fair in September.

CURRENT AGRICULTURAL LITERATURE

COMMENTS AND CRITICISMS ON CONTEMPORARY CONTRIBUTIONS

"The North Dakota Man Crop" is the title of an article in the November "World's Work." It describes in detail the work of Tom Cooper, backed by various business interests of North Dakota, in bringing about a better era for the farmers of that state. The active and vigorous methods employed are typical of the Northwest and even now are showing material results. The old extensive farming of cereals only, is giving way to diversified crops and live stock.

Colliers Weekly for November 2 prints a story called "The Price of Potatoes." It is written in popular style and is designed primarily to entertain but the style only heightens the philosophy of human nature and the principles of agricultural economics contained therein. It is worth reading.

The Breeders Gazette for October 23, contains another leading article from the pen of Samuel R. Guard. He discusses the future beef prospects of the Ohio Valley. He believes that the time is close at hand when the beef animal will again hold the supremacy among our southern valleys. The present tendencies seem to indicate that the time will come when, a pound of feed turned into beef will produce as great returns as a pound of feed turned into milk.

In view of the varied discussions regarding alleged "rain making" at

Battle Creek, Michigan, by detonating dynamite, it is of interest to read Prof. Willis L. Moore's article in the Rural New Yorker of October 19, setting forth the reasons why the rain which followed these dynamite explosions was not due to the effects of said explosions.

Co-Operation among German Farmers, Dean H. C. Price, the October 12th issue of the Twentieth Century Farmer contains a brief account of the German co-operative organizations for both buying and selling. Of these societies there are 24,000, or five-sixths of all societies classed as agricultural associations.

"The Banker and the Farmers." Dean H. C. Price, Rural New Yorker, October 19. This article discusses five fundamental factors that must be carefully considered in constructing a system of agricultural credits in the United States.

"Studying Agriculture in Europe." Henry A. Wallace. Wallace's Farmer, October 18. Mr. Wallace tells of his visit in detail to several French farms but dwells more at length upon two. The article relates those things that would be of common interest to the farmer.

"What Ohio is Doing for the Farmer, or the Experiment Station." By C. A.

Waugh, in the Ohio Farmer. A comprehensive article taking up each department separately, including those not ordinarily mentioned such as the photograph gallery and county test farms.

"Some of the Best Agriculture in Europe." Dean H. C. Price. Twentieth Century Farmer, October 26 1912. An account of educational and practical agriculture in Switzerland. It is interesting to observe the fact that in that country there are 20,000 mowing machines owned as compared to seven grain binders, two or three of the latter being owned by agricultural colleges and experiment stations. About seventy per cent of the land is farmed in grass and the one way that Swiss people get returns from grass is thru

the dairy cow. Interesting facts relative to agricultural education are also dwelt upon.

Everyone should read Professor Vivian's series of articles in the Ohio Farmer, describing the various points of interest visited by Mr. and Mrs. Vivian on their trip around the world. They are now leaving Naples, Italy, and will spend the next month or so in the valley of the Nile.

"Ohio's Struggle to Check Hog Cholera." T. L. Wheeler. Country Gentleman, October 26. A well illustrated article describing the new serum plant just east of Columbus, and telling of the organized effort being made by the State to prevent the periodic ravages of hog cholera.



ANSWERED BY EXPERTS

Questions addressed to Dept. D, Agricultural Student, will be turned over to the particular faculty member most capable of answering, and question and answer will be printed in succeeding number of "The Agricultural Student". Questions will be answered by mail if stamped envelope is enclosed.

How are tomatoes ranked as a truck crop? Are they considered profitable, and what kind of soil is best adapted for their growth? —R. A. R. Darke Co.

In 1911 one cannery alone contracted for 182 acres of tomatoes. The average yield per acre was 6 tons, at a price per ton of \$10.00. This crop is more susceptible to damage by extremes of weather than field crops, but the acreage is increasing slightly each year. One grower received \$88.00 per acre from two acres as a maximum, and \$11.00 as a minimum income from crop. The acreage is small per individual grower. The cultivation is the same as corn. Securing a good stand of plants is more difficult than with other crops. Cost of setting plants and picking fruit per acre for the average crop is about \$9.00. The majority of growers consider the tomato a paying crop on a small farm, and the land is left in fine condition for wheat. Good well drained soil is required. The labor needed in producing crop is rather light. Prices range from \$6.00 to \$10.00 per ton, and yields run from 2 to 9 tons per acre. Clay soil when underdrained and fertilized is best for tomato production.

"Last summer we had a most flourishing patch of Jonathan Squash in our garden which gave promise of many delicious pies. During the latter part of August the patch became infested with squash bugs. The vines

began to die one by one and the bugs to increase until the whole patch was taken. Millions of bugs were present. Knowing of no way to combat them we let the matter go and lost our squashes. How could we have controlled the bugs and saved our crop?" —A Reader.

The squash-bug is most readily controlled by covering the pumpkin hills with netting while the plants are small. This prevents the adults which come out in the early summer from depositing their eggs upon the plants. This covering can readily be done by the use of cheese cloth fastened with stakes. If you neglect this at the proper time you can practically control the pest by watching for the eggs on the under side of the leaves and destroying them while hoeing the vines. Hand picking of the bugs is also effective on a small scale. As these bugs have sucking mouth parts and feed on the sap of the plant, the use of poison is non-effective. Squash bugs are rarely very troublesome where a large acreage of pumpkins is grown in one field.

"On July 14th, 1911, we sowed two acres of alfalfa, and where properly inoculated this was very thrifty until winter. During the winter a considerable percentage of the plants was lifted from the ground by frost. In 1912 we thought to remedy this by sow-

ing earlier and allowing the plants to become well rooted before cool weather. According to this idea we prepared a nice seed bed and sowed three more acres June 1st, 1912. The result was that fox-tail came up in such quantities as to make the alfalfa patch almost worthless. How is a person to plant late enough to avoid weeds and yet get the alfalfa well rooted for winter? What date do you advise for sowing alfalfa in Ohio?"—A. W., Belmont Co.

The freezing out of alfalfa seeded in July 1911 was probably due to the very severe winter that followed. Alfalfa is more easily lifted out of the ground by freezing and thawing if the soil is poorly drained or is lacking in organic matter. If these conditions existed in the field in question they were probably responsible for a part of the winter killing.

Alfalfa may be seeded any time from early spring until September. When seeded later than the first of September, unless the fall is a favorable one, the plant will hardly make a sufficient growth before winter. When seeded in July or August the plants should make enough growth to carry them through any ordinary winter.

The best way to control foxtail and other troublesome weeds that are likely to injure the stand, is that of cultivating the field thoroughly with a harrow or weeder, at intervals of a week or ten days, until the weeds are killed. If the field is badly infested with them it may be necessary to continue the cultivation at frequent intervals until July or August, but if the seeding is delayed until the weeds are killed the chance for a good stand is greatly increased.

Selecting the Laying Hen.

"We have seen advertisements as to

how to select laying hens.—Can you give us any advice in this matter?"—C. G. R.

Mature pullets or one-year-old hens should always be selected as winter layers. Select those that have bright eyes and red combs and that are quite active. They should be those that are off the roost very early in the morning and are busy the entire day in search of food. Some consideration is given to the shape of the body. It should have a long neck, small head, broad long back, and the body forming a triangle on the sides coming to a point beneath the feet.

Seeding Wheat.

"How much good clean seed wheat should I sow per acre?"—C. A. H.

One should sow two bushels on land of average fertility and less only on very poor land. Continued experiments have shown that two bushels of seed give better results than smaller amounts.

Ques.—"Will you please give me any bulletin and any information you can as to the advisability of feeding silage to hogs? What other than milk would be a necessary adjunct to corn silage, and if the silage be two-thirds corn and one-third soy beans by bulk, what additional feed would be necessary for raising hogs or to feed to brood sows?"—W. C. Warren, Ohio.

Ans.—There has been more or less experimental feeding of silage to hogs, but with unsatisfactory results. The cut up fodder itself is not relished excepting in a small way, so that the grain is the only feature that becomes a practical feeding proposition. You had best give no consideration to silage as a feed for hogs.

Secondary Agriculture

Devoted to the Interests of Agricultural Education in High and Common Schools

J. W. HENCEROTH

Well might the poet, who sits in his room, sing of the "Melancholy Days," but the teacher who took his class to the field on some of the recent delightful autumn days is singing a different chord. How could the clear skies with the "haze over highland and lowland," the crisp fresh air with a hint of frost, the indescribable colors of the trees, the birds going south or preparing winter homes, or the squirrels storing up nuts to lower the "high cost of living," do anything else but cheer and inspire one for greater work? The blood is quickened in one's veins, the mind is alert and the pupils and teacher echo, "Why agriculture is interesting, isn't it?"

How Plants Get Their Food.

Roots and How they get their Food From the Soil. Materials—(1) A large mouthed bottle, a glass tube, an egg, some sealing wax and water. (2) Sawdust and a marble or sandstone slab.

1. Plant food must be in liquid condition before it can be absorbed by the plant. The root structure of the plant is very intricate. There are little roots attached to the rootlets that are so small the naked eye cannot discern them. These are called root hairs and through them the plant receives its food. They are composed of a single cell filled with an albuminous substances called protoplasm, which is similar to the white of an egg.

As the covering of the cell is not

porous in the ordinary sense of the word, the question arises as to how the liquid food enters the cell. This is accomplished by the principle of osmosis. It has been proved by scientists that if a dense liquid is separated from a less dense one by a thin membrane, they will flow together, the less dense fluid flowing into the more dense one in greater proportion than vice versa.

This can be proved in the school-room with an egg, a glass tube, a large mouthed bottle, some water and some sealing wax.

The glass tube is inserted into the small end of the egg and sealed in place with the sealing wax. The shell of the large end of the egg is then broken off to expose the membrane and the large end put into the water. The water and the white of the egg will, in the course of a few hours, flow up the tube.

After the liquid enters the root hair cells, it is carried up to the plant by means of capillary attraction, which is a power that tends to raise the water.

2. The root hairs of a root system can collect nourishment from the undissolved plant food by tending to dissolve it with an acid secreted in the membrane of the root hair. To prove this, cover a polished piece of marble or sandstone with wet sawdust and plant a few seeds in it. The root hairs will sprout, and, when removed, the marble will be rough—Volume Library.

Planting the Apple Seeds.

Ohio is fast coming to be recognized as one of the best states in the Union for the production of apples. The Lake Erie slope and the more hilly sections are especially well adapted. So rapidly is the industry growing at the present time that we feel safe in predicting success for whoever goes into the orchard business right. This is just what we want many of our Ohio boys to do and we will tell them how.

Well, you boys have plenty of time and we think you would like some day to be able to say that you planted the seeds for the trees in your orchard. This is an easy matter. Get two or three fresh plump apple seeds from any variety you can. Do not let them dry out. Plant them this fall about two inches apart in a row in a rich corn and potato soil where you are sure water will not stand during the winter. Take care to put them where they will not be disturbed next spring. Cover them one fourth inch with soil and over this scatter some light chaff or a few leaves. Over the whole lay a few old boards. During the winter the seeds will freeze and in the spring will readily germinate. The boards must be removed as soon as the tree buds begin to start in the spring. In another number we will tell you what to do next.

The School Seed Collection.

R. M. Salter.

A collection of agricultural, garden and weed seeds forms one of the most useful and at the same time least expensive adjuncts to the apparatus of a class in agriculture. It is of use not only as a means of familiarizing the pupil with the common farm and garden seeds but can also be used in exercises of seed identification and determinations of seed adulterations.

The contents of such a collection is briefly outlined below:—

Grains—

Corn
Wheat
Oats
Rye
Barley
Buckwheat, etc.

Grasses—

Timothy
Kentucky Blue Grass
Redtop
Orchard Grass, etc.

Clovers and other Legumes—

Red Clover
Alsike Clover
White Clover
Sweet Clover
Crimson Clover
Alfalfa
Soybeans
Cowpeas
Canada Field Peas, etc.

Millet**Sorghums****Fibre Crops**

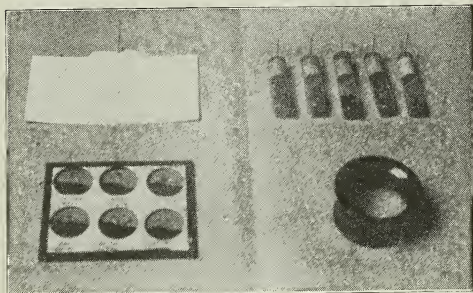
Cotton
Hemp
Flax

Garden Seeds**Weed Seeds.**

This outline is not complete and can well be subdivided. For instance corn might well be subdivided into the different types of corn, as, dent corn, soft corn, flint corn, pop corn, pod corn and sweet corn. A further subdivision of the types of corn into a few of the better known varieties make the collection still more complete. Thus dent corn may include Reid's Yellow Dent, Leaming, Clarage, Boone County White, etc. Several of the groups in the outline besides corn can be subdivided one or more times. There are numerous subdivisions under garden

seeds and weed seeds which will suggest themselves to the teacher. The weed seeds selected should be those more commonly found as adulterants and impurities in grass seed, clover seed, etc.

There are several methods for mounting and classifying the seeds. One of the best methods is to place the seed samples in small glass bottles or vials and mount them on cardboard by means of string or glued paper strips. A method for the mounting of small seeds to be preferred perhaps to the above consists in placing the samples in the apertures formed by cutting round



Seeds in Vials; Filing Card; Seed Microscope; Arrangements for Small Seeds.

holes in a sheet of heavy cardboard and placing this between two plates of glass of the same size as the cardboard sheet. The edges are now bound with adhesive paper tape, commonly known as "passe partout" tape. The small glass bottles or vials can usually be purchased at a small price at any drug store while the glass plates can be obtained, cut to size, from the furniture or hardware store. The adhesive tape can be bought at the drug store or furniture store. Each vial should be provided with a paper label on which is placed the number of the sample. When mounted between glass plates the number of the sample can be marked on the cardboard.

A record of the contents of the collection can best be kept by means of a card index and description book. For each sample in the collection a card is prepared giving at the top the number of the sample, as "25—Wheat." Below is written the type, variety, etc., as, "description number," mentioned later. The cards are arranged in numerical order and kept in a filing box or drawer.

In connection with the card index it is well to keep a description book. This is preferably a cloth bound blank book in which a short description of each sample is entered. These descriptions may be written and entered either by teacher or pupils. They consist of a brief account of each sample containing such items as botanical relationship, region of growth, manner of growth, adulterants, impurities, uses, etc. They may be illustrated with a few drawings or pictures pasted in, these being cut from bulletins, books etc. The descriptions are numbered consecutively and the "description number" placed upon the card in the card index corresponding to the sample described.

Most samples for a collection can be obtained by the members of the class from farmers, elevators, seed stores, etc. Seeds which can not be obtained from such sources can usually be obtained from the Bureau of Plant Industry of the U. S. Dept. of Agriculture, Washington, D. C., or from the State Experiment Station.

There are several exercises which the teacher of an agriculture class may assign to the pupils that will acquaint them with the various farm seeds and their impurities or adulterants.

One exercise is that of seed identification. For this the teacher should obtain relatively pure samples of seed of

the various clovers and alfalfa, or of the grasses, and mix them thoroughly and make uniform composite samples. A small sample of each mixture is taken by the teacher and with the aid of a hand lens the proportion of various seeds is determined. Each member of the class is now given a small sample and required to separate the seed and determine the proportion of the various constituents. The proportion obtained by the pupils should check quite closely with that obtained by the teacher. The seed collection serves the pupil as a means of identifying the various seeds in the mixture.

A second exercise consists in the determination of the impurities in a sample of commercial seed. The teacher should obtain samples of the various seeds and require the pupils to determine the per cent of purity of the sample, to identify the impurities, and determine the percentage of each. These percentages should be determined by weight where balances, delicate enough to weigh small quantities of seed, are available. When this is not the case the per cent by number may be determined. In this exercise the seed collection is used as a means of identifying the various impurities found.

Numerous other exercises identifying and testing seeds will occur to the mind of the teacher. The germination test of seeds is a very instructive exercise. Methods for making these tests can be found in most text books on agriculture.

Bulletins which will be of value to the teacher contemplating making a seed collection are as follows:

Farmers Bulletins Nos. 428, 278, U. S. Dept. of Agr. Washington, D. C.

Ohio Experiment Station Bulletins

Nos. 175, 225, Circular No. 117—Wooster, Ohio.

Pennsylvania State College Agr. Exp. Station. Bulletin No. 109—State College, Pa.

If a collection of seeds is made as indicated in this article it will prove to be of untold value in the school. Bulletin No. 428 is excellent and should be in the library of every teacher, pupil and especially every farmer should have it.—Editor.

Don't overlook the Current Agricultural Literature Department. The most up-to-date books and the best current articles in the farm papers, periodicals and magazines are reviewed each month.

Teachers, in the seventh and eighth grade, do you have any particular problems that are bothering you? If you have just let us know about them, our time and information is at your command.

The State and National Government is making the greatest effort in its history to help the teachers and country schools. To receive the full benefit of this service the teacher must keep in touch with the source of supply. Send to the State School Commissioner for the literature he has especially for you. Then don't neglect to get the latest and best from the U. S. Department of Agriculture, the State Experiment Station or the Agricultural College. Keep the bulletins in some definite order so they may be used to the best advantage. Serviceable pasteboard files may be purchased very cheaply and the bulletins filed according to stations or by subjects.

Agriculture in Alliance High School. **Charles L. Burrell.**

If the teaching of agriculture is to be practical and successful, the activities of the pupil must be directed at home as well as at school. It has been my aim to have demonstration work and some experimental work by the pupil at school. But the pupil does much individual work at home.

A record of all the most important demonstrations, experiments, and individual work is kept in a loose-leaf notebook provided by the pupil. These notebooks are kept in the class-room, the individual work being brought to me for inspection before it is placed in the book. While laboratory work may come any day, we usually have Monday and Friday set aside for that purpose. The laboratory exercises consist of two forty-five minute periods.

A few of the subjects we considered during the year were Variation in Plant Life, Fertilization of Plants, Propagation of Plants by spores, division and seeds, Corn Judging, Germination Test of Corn, and Seed Analysis. Osmosis in plants was studied. Foods were tested for proteids, starch, sugar and fats. The most important gases such as oxygen, nitrogen, hydrogen, and carbon dioxide were prepared. Under the subject of wheat, a microscopic study of the grain and milling process was made. Also the amount of gluten in flour was determined. Forage crops received attention making a study of leguminous plants and showing tubercles on the clover roots. Silos were considered under forage crops. Tests of plant and animal fibers were made. In the mechanical analysis of soils some ten different demonstrations were made. The effects of fertilizers on soils were studied. Under animal husbandry the cow received

special attention and a study of dairy products, making Babcock tests, and tests for the amount of solids in milk, whey, albumen and milk sugar. Some attention was given to poultry raising and drawing of plans for a poultry house. Special work was done under farm improvements, the girls drawing house plans and the boys barn plans. Contest work in back lot gardening and lawn improvement was carried on. Plans were made for decoration of High School grounds with flowers, shrubbery and trees, allowing space for a running track, two tennis courts, and a basketball court. Friends and enemies of plants and spraying for the control of insects and fungous diseases were studied, also fruit-growing, giving special attention to apple culture.

The above is merely an outline in addition to our regular text-book work.

CHALK BOX EXPERIMENTS WITH SOIL.

I. To Show Effect of Air on Soil.

Materials—Four chalk boxes.

Fill one with loam, loosely packed. Fill the other box with clay or leaf mold, tightly packed. Plant the same kind of seed in each one and give both the same attention. In which does the plant seem to grow better?

II. To Show the Advantage of Soil Foods or Fertilizers.

Fill each with the same kind of soil. In No. 1 place a small quantity of stable fertilizer. In No. 2 a small quantity of high-grade commercial fertilizer. In No. 3, same quantity of cheap commercial fertilizer. In No. 4, omit fertilizer. Plant same kind of seed in each box; cultivate all plants in each box by the same method. Notice the difference between the plants that receive the fertilizers and those that do not.

WITH THE BREEDER

NOTES OF INTEREST AMONG THE FLOCKS AND HERDS

The prominent saddle horse firm of Collins and Redman of Kentucky has dissolved, the interest of Mr. Redman having been bought by William Collins. This company has in the past owned many of the best saddle horses in the country, among them being Roosevelt and the great three-gaited champion Mildred C.

The poultry plant of the University was recently presented with a pen of Partridge Wyandottes by The Sheffield Farm of Glendale, Ohio. Twelve pullets and a cockerel compose the pen and each one shows the excellent characteristic qualities typical of the Sheffield Farm stock.

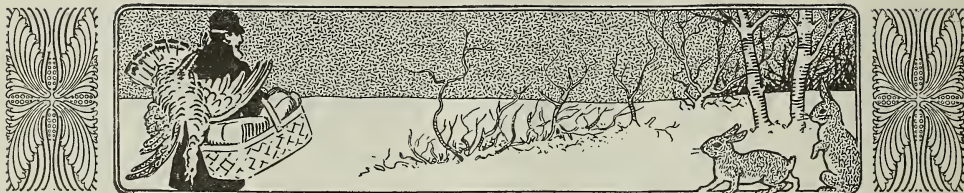
Warder's Financial Queen 250796 is the new grand champion cow of New England in respect to production. Her authenticated record is 8010 lbs. of milk and 599 lbs. of butter. This cow is owned by the celebrated Jersey Hood Farm of Lowell, Mass.

An addition to the Berkshire Farm of Fort Hill, Ft. Washington, Pa., was recently made by purchasing the famous boar, B. D. Masterpiece, from the Gregory Berkshire Farm. This boar is a great prize winner and comes from a family that knows what blue ribbons are.

The Wisconsin College of Agriculture has added to its breeding stud of horses, two imported black Percherons and a prize winning Clydesdale. These horses will be used for breeding and instructional purposes throughout the state.

Mr. Billings' pure bred imported Orloffs were a feature at the recent Lexington meet. These trotters were driven by Russians and were gladly received by the American drivers.

Competition in production among breeders of Holstein-Friesians is very keen. Some months ago it was announced that Pontiac Lady Korndyke had won the crown in seven and thirty day productions, her record being 30.442 lbs. butter fat from 601.4 pounds of milk in seven days, and 125.541 pounds of fat from 2496.7 lbs. of milk in thirty days. Pontiac Lady Korndyke must now give place to Valdessa Scott 2nd, with a production of 33.4 lbs. fat from 694.6 lbs. milk in seven days and 132.388 lbs. fat from 2,933.9 lbs. milk in 30 days. This wonderful cow on June 11-12th 1912, produced 10.43 lbs. fat from 199.5 lbs. milk, an almost incredible amount. The test of Valdessa Scott 2nd was carefully verified under the direction of Malcolm H. Gardner Superintendent of the Advanced Registry.



November News Notes

In order to compare the milling and baking qualities of various wheats the Agronomy department will install an Allis-Chalmers flour milling outfit. Ovens will be placed in the same room so that a complete test can be made with the flour.

Prof. W. R. Lazenby of the Forestry department spoke of his trip abroad at the open meeting of the Grange Saturday evening, October 26

Students in agronomy 109, "Seeds and Market Grains," have judged corn at several important fairs and corn shows within the proximity of Columbus. They are reported to be doing high class work as amateur judges.

Several score of tomato plants are growing nicely in one section of the greenhouse south of the Horticultural building. These plants, set out in early fall, will mature tomatoes about holiday time if they receive plenty of sunlight and the weather is not too severely cold.

Professors Oscar Erf and O. C. Cunningham attended the National Dairy Show at Chicago. Prof. Erf gave an address on "Buttermaking."

Men of the Saddle and Sirloin Club may be interested in knowing of the club of the same name in Chicago. It

is composed of the leading recognized men of the Chicago stock yards. The membership is not large and to say that such men as J. Ogden Amour belong conveys the idea of the wealth and influence of the organization. The Club has gorgeously furnished rooms immediately in the rear of the new Stock Yards Inn hotel. Here are paintings of some of the leading animal husbandrymen of the country, and of famous animals. In the same building are the offices of the leading cattle clubs in the United States.

Sam R. Guard and Glen Hayes, both on staffs of leading agricultural papers with offices in Chicago, met and showed the dairy team a good time while there. Both seemed to feel the Ohio State spirit as much as if the contest was one of football, instead of cattle judging.

Newlylaid I was the first hen of the University poultry colony to make a record. She laid her first egg, after seeing daylight only four months and 14 days. The usual time is from 5 1-2 to 6 months for the first egg after hatching.

Nine tons of fine alfalfa were taken from seven acres of a spring seeded alfalfa field at the last cutting. It is unusual to cut a crop in the fall from a spring sown bed.

The student directory for this year contains the names of 3037 students and 270 members of the teaching staff.

Exceptional favorable weather this fall has enabled classes in Animal Husbandry, Horticulture and Rural Economics to make use of the wonderful outdoor laboratory, which is in the shape of orchards, farms and herds near the city. Some seniors who have worked in all these lines say that there is no hopes of becoming acquainted with the office girls in Townshend Hall this year.

Two new features have been added to the second conflict of the "Battle of the Kernels" to be held Jan. 9-10. A students' judging contest will be in line this year, the members of the class of Agronomy 106 competing in one class and 109 in the other. This was not tried last year, and the starting of the custom this year should add interest to the contest.

Those who are in the agricultural courses and have no available sources for entries of corn can secure samples from the University farm. Those in charge are especially anxious to have every person that can to make entries of both corn and small grains, so as to make a showy display as possible.

R. F. Crim, B. E. Pontious, W. C. Courtright and E. O. Williams were admitted as new members of the Saddle and Sirloin Club at their last monthly meeting.

"Resolved, that the Agricultural College should adopt the honor system," was the subject of debate at a recent meeting of Townshend Literary Society. The subject caused considerable sentiment on both sides but the decision

was given to the affirmative, debated by J. C. Windau and E. F. Hoftyzer. The negative side was supported by Roy Buchanan and F. E. Piper.

During the International Live Stock Show the Association of American Agricultural Students will again hold their banquet. This annual get-together feature of the stock show has arrived at a permanent stage. Many broad acquaintances are annually formed. This year the Ames Agricultural Club will have charge and it is desired that students confer with Harry Drain, President of Saddle and Sirloin Club at an early date for accommodations.

In an effort to combat the epidemic which has been sweeping Kansas and Nebraska, during the summer and killing some of her best horses, the Bureau of Animal Industry at Washington D. C. has issued circular 122, which treats on the "Epizootic Cerebro Meningitis of Horses."

The Animal Husbandry department has recently sold to Mr. B. L. McFadden, of Medina, a son of the Holstein cow, Ohio Maud, to head the McFadden herd of pure bred Holstein-Friesians. This calf was by "Sir Duke Walker," the valuable bull owned by the University, and is out of "Ohio Maud," who is an Advanced Registry cow, with a record of 516.9 pounds of milk in a week and 16.42 pounds butter fat.

The University of Illinois has just published a very interesting bulletin, No. 158, entitled, "Relative Economy, Composition, and Nutritive Value of the Various Cuts of Beef." This contains data that is of utmost value to the housewife and the man who pays the bills.

The beautiful new library will be occupied by the beginning of the second semester. Although the original appropriation made by the legislature will not cover more than a third of the equipment for the interior of the building, the library will not be allowed to stand idle for this season. Without further equipment library facilities will be greatly bettered in the new quarters.

Arthur G. Babcox, landscape architect of Cleveland, recently gave several short talks to students along this line. He expressed himself as being greatly interested in the welfare of the University and endorsed an appeal for a new horticultural building.

Clad in their proudest clothes, over 1000 fowls of the University poultry plant paraded before the admiring public at the formal opening of this department on Saturday, October 12. The display attracted a large crowd, many of the people expressing a surprise at the size and modern character of the plant.

There are three main buildings, the instruction building, laying house and brooding house. The latter two have been in use for some time but the instruction building is just recently finished. In this structure, the basement contains a large incubator, with a capacity for 1200 eggs, together with several small ones. The room in which the fowls are killed and dressed is also located here. The second floor is fitted up for lecture purposes. The third floor, still unfinished will be used for dormitories for students who work in the poultry department. There are eighteen students taking poultry courses at present.

A number of steers have recently been purchased for class room work.

Two very good specimens of Red Polled were purchased of H. W. Renkert & Sons, of West Liberty. These are good enough for International show purposes. A number of grade Shorthorn steers were purchased of Mr. Thomas Mattinson, of South Charleston, for special use in the freshman class. Most of these steers will be fattened and disposed of on the market some time during the winter.

The Animal Husbandry department has been invited to exhibit at the National Corn Show, at Columbia, S. C. next winter, the exhibit of wools and wool products that have been shown at the International Exposition at Chicago, and the Keystone Fair at Pittsburgh. The exhibit that will be made at Columbia will hardly be as large as the Chicago exhibit, but will represent somewhat more of a classified educational display.

Dr. S. E. Price, president of Ottawa College, Kansas, who recently spoke to the students at convocation is a brother of Dean H. C. Price.

From January 6 to February 28, 1913, the College of Agriculture offers two popular courses in agriculture and poultry husbandry, especially designed to meet the needs of Ohio farmers who are unable to avail themselves of longer courses of study. These short courses offer such men an opportunity to become familiar with the results of the latest investigations in agriculture and to study the theories resulting from this research and their practical application on the farm.

To facilitate the instruction in poultry husbandry, a new poultry plant has been erected, consisting of a laying house, 126 feet long, a pipe system

brooder house with a capacity for 500 chicks, gasoline brooder houses, incubator cellar with an assortment of the most prominent makes of incubators. This entire plant is placed at the hands of students.

The annual apple show of the Ohio State University Horticultural Society will be held in Townshend Hall, on December 5 and 6. Competition is open to agricultural students and practical fruit growers over the state. The entry list includes plate, tray and box displays. Liberal cash prizes are offered as well as a number of magazine subscriptions and other articles of value to fruit growers. Prospective exhibitors who intend to enter fruit for competition are requested to communicate at once with the committee in charge and secure premium lists and entry blanks. Address C. L. Long, Horticultural Department, Ohio State University, Columbus.

The first bulletin of the Home Makers' Reading Course, published this fall by the College of Agriculture is entitled "Meats;" written by Edna Noble White, Associate Professor of Domestic Science. It explains the principle of cooking meats. It is free and may be had by addressing A. B. Graham, College of Agriculture.

During the latter part of October, Professor J. Warren Smith spent a few days in New England. His trip was in the interest of protecting fruit from frost, and of co-operative meteorology work with Experimnet Stations.

In place of the regular laboratory work the class in advanced stock judging recently spent an afternoon at the stock farm of Palmer Bros. at Patas-

kala, where several rings of choice Southdown and Shropshire sheep were passed upon. It was a rare privilege to see so many good specimens of the ovine tribe. Mr. Palmer is a graduate of the class of '07 and has many state fair premiums accredited to his flock.

The Stock Judging Team which will represent Ohio State at the International Fat Stock Show at Chicago November 30th to December 7th is as follows: H. C. Baumgardner, Paul Gerlaugh, S. M. Salisbury, B. A. Williams and E. O. Williams. The alternates are R. L. Smith and W. S. Bauchmiller. The team will receive special coaching from now until the time of the show. A visit to Greene county is one of the trips which is scheduled. The Students' Judging Contest takes place on Saturday, November 30th, and we are all hoping that the Buckeye team will show up in the front rank.

The exhibit made by the Animal Husbandry department at the International Exposition will be the choicest collection of animals ever taken to Chicago. There will be five horses, 3 Percheons and 2 Clydesdales. Two of the five have already won important prizes in the show ring. Five steers only will be shown, two of which are extra good individuals. The University has the finest collection of fat wethers that it has ever owned, and a very select lot will be taken to Chicago. As usual, a display of Berkshire barrows will be made, with a number of Duroc-Jerseys, Poland Chinas and Yorkshires also. Prior to shipping to Chicago, an exhibition will be made at night in the Judging Pavilion of much of the live stock. This live stock show will be much like that of two years ago, and will be under the joint auspices of the Department and the Saddle and Sirloin Club.

The Animal Husbandry department has recently purchased of Mr. O. H. Pollock of Delaware, one of our 1912 graduates, two very choice Shropshire wether lambs. These will be kept in the University flock until 1913, and will be valuable for class room work.

Reserve November 29th. On that date all Ohio State men and women, both graduates and former students, will gather to hear representatives from the University faculty speak about the progress of the University, the needs of the University, and suggest some plans by which the alumni, by working in the interest of their Alma Mater, may accomplish the desired aims.

Then there will be lots of life-songs, college yells, music, and a general "get together" time. The purpose of this great gathering, the second of its kind, is to develop service for the University, to bring the men and women who have gone from beyond the walls of their Alma Mater in closer touch with her and into a stronger bond of fellowship among themselves.

It also advertises to all how representative our alumni are. It will develop greater interest in Ohio State in the localities where these reunions will be held. There will be more than fifty gatherings in Ohio and the alumni and former students in every county of the State will gather at some central point to renew their interest in our great and growing institution. Outside the State meetings will be held in all the large

cities of the country and the affair will be a national event of prominence and also one which will identify our University and her adherents as examples of the most progressive and aggressive kind.

Every man and woman is urged to be present at his local celebration. The individual service of each alumnus and alumna will assure the success of "Ohio State Day."

As our noted alumnus, Mr. E. E. Sparks, president of Pennsylvania State College, said, speaking of this event, "It is a great idea, I am proud of its originator, and prouder still of the University which gave it birth." We are counting upon your support. Do not forget the date.

Mr. Cruikshank, our new horticulturist in the Extension Department, is now actively engaged in carrying on his work over the state. Mr. Cruikshank received his college training at the University of Maine and until recently has been engaged in commercial orcharding on the Pacific Coast. The first horticultural extension school of the season opened November 11th at Gallipolis.

Mr. H. Evans, formerly of the Animal Husbandry Extension Department, is now in the employ of the Ohio State Board of Agriculture. Mr. Evans will lecture at various farmer's institutes over the state this winter.

All subscribers whose term of subscription has expired or whose payments are overdue will confer a great favor upon the management by remitting the subscription price at their earliest convenience.

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December

“OPPORTUNITIES” NUMBER

It will contain many articles by leading authorities describing agricultural opportunities to be found throughout Ohio and the United States. This number alone is well worth the price of subscription. Have us send it to your friends or relatives who are interested in these opportunities. Address all communications to The Agricultural Student Publishing Company, Ohio State University, Columbus, Ohio.

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Will organize a beginners' class Wednesday evening, November 20th, 7:30 o'clock.

NEIL AVE. ACADEMY,

647 Neil Ave. Phones: Auto 4431; Bell 6189.

Will organize a beginners' class Friday evening, November 22nd, 7:30 o'clock.

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bus Minuet and Rye Waltz taught in one term.

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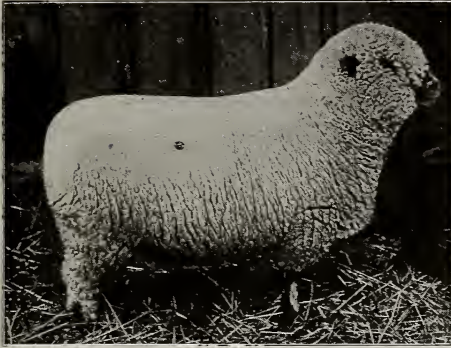
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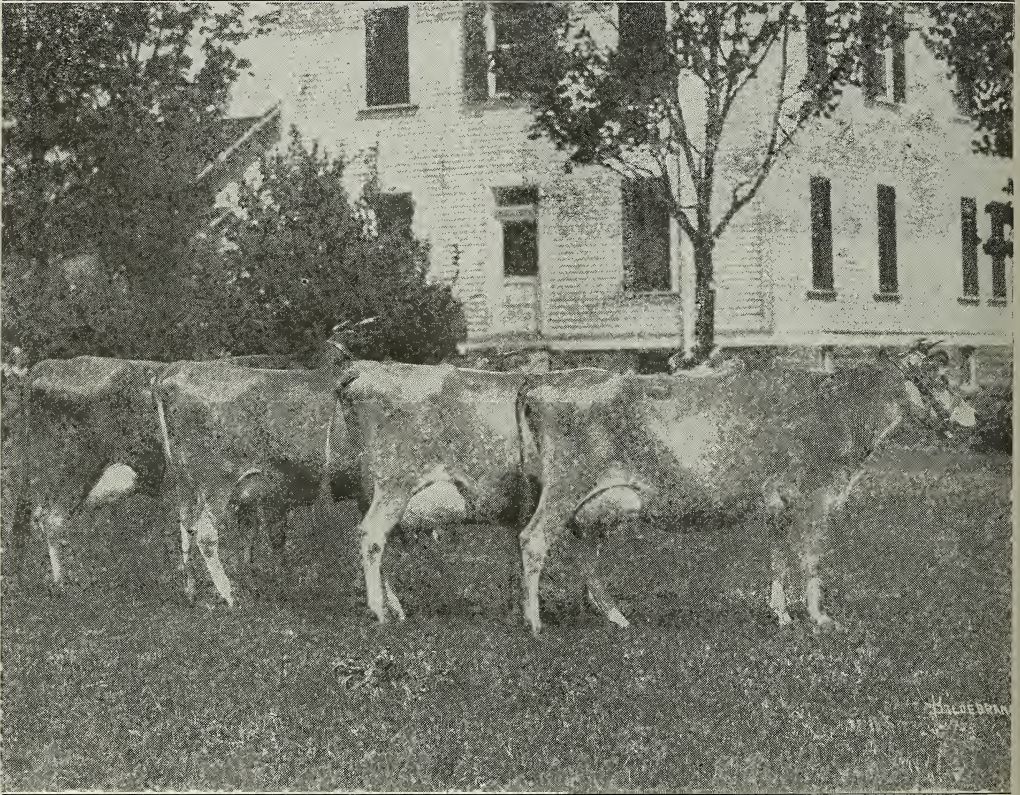
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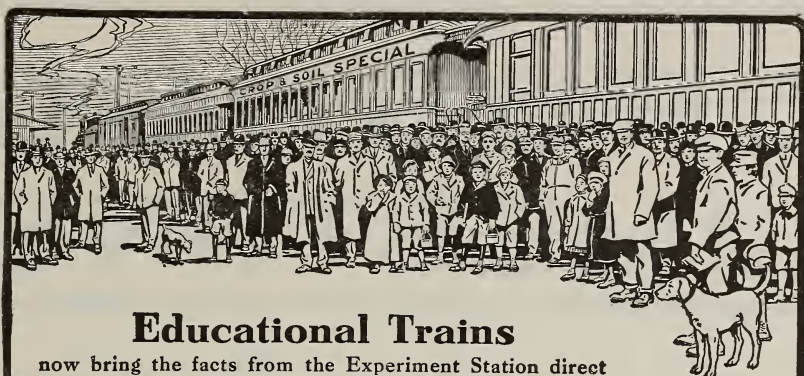
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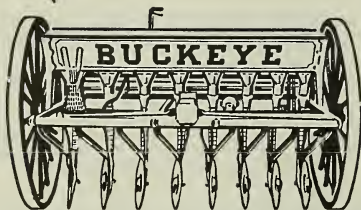
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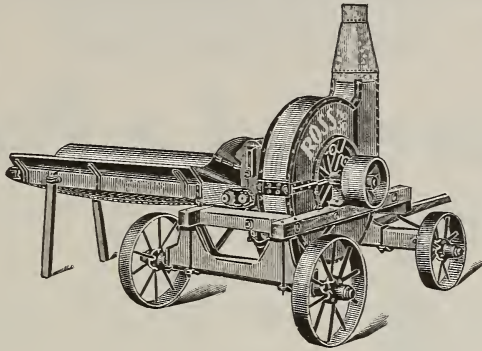
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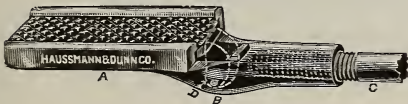
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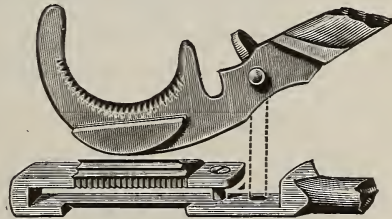
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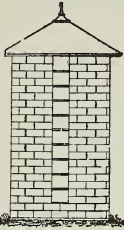
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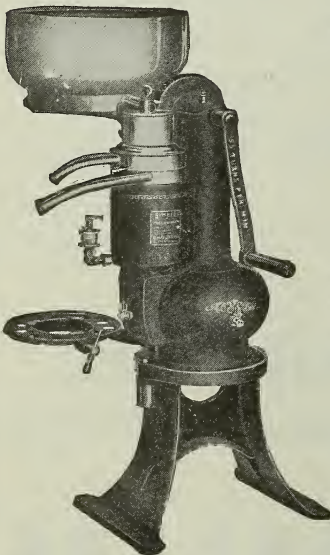
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